Jumping Run Creek at Payne Dairy Stream Restoration

2004 Annual Monitoring Report

Delivered to: NCDENR/Wetlands Restoration Program
1619 Mail Service Center
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February, 2005

Ecosystem Enhancement PROGRAM

NCDENR

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2004 Jumping Run at Payne Dairy Monitoring Abstract

Jumping Run was restored through the North Carolina Wetlands Restoration Program (NCWRP). The goals and objectives of this project are as follows:

1.) Restore 5,177-linear feet of Jumping Run Creek through dimension, pattern and profile adjustments.
2.) Restore 470-linear feet of Jumping Run Creek through dimension and profile adjustments and cattle exclusion.
3.) Establish a riparian zone surrounding restored sections of Jumping Run Creek, an additional 1,350-linear feet of Jumping run, and 1,350-linear feet of a tributary.
4.) Improve the habitat within the channel and the riparian zone.

This is the 4th year of the 5-year monitoring plan for Jumping Run.

Table 1A. Background Information

Project Name	Jumping Run Creek
Designer's Name	Kimley-Horn and Associates, Inc. PO Box 33068, Raleigh, NC, 27636 (919) 677-2000
Contractor's Name	Shamrock, Inc
Project County	Alexander County
Directions to Project Site	From Statesville, follow Interstate I-64 west to Millersville road. Turn left (south) on Millersville road and follow to Henry Road. Turn right (west) on Henry Road until it dead ends with Paul Payne Store Road. Turn right on Paul Payne Store Road and follow to the top of the hill. At the op of the hill turn right onto a field road. The beginning of the project is located at the bottom of the hill. Please note that this is a private residence and permission is suggested prior to entering the site.
Drainage Area	1.2 sq. mi. (End of Are 3 - Upstream of SR-1614) 2.2 sq. mi. (End of Area 4 at the end of the project)
USGS Hydro Unit	3050101
NCDWQ Subbasin	05-07-04
Project Length	5,755 Linear feet (Restoration) 2,640 Linear feet (Preservation)
Restoration Approach	5,177-feet of dimension, pattern, and profile 470-feet of dimension and profile modifications 1,350-feet of cattle exclusion and riparian enhancement 1,400-feet of cattle exclusion and riparian enhancement (one side)
Date of Completion	2001
Monitoring Dates	June, 2001 (as-built); December, 2001; December, 2002; October, 2003, July 2004

Table 2A. Summary of Results

DIMENSION	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004
Bankfull Cross-sectional Area	9.4	6.6	19.2	11.2	9.0	7.8	12.8	7.2	8.3	6.8	27.1	25.3	13.5	8.3	15.9	14.9
Bankfull Width	14.0	9.8	16.0	9.7	11.5	7.8	13.7	8.7	9.0	8.7	15.0	12.9	17.0	13.5	14.0	12.9
Bankfull Mean Depth	0.7	0.7	1.2	1.2	0.8	1.0	0.9	0.8	0.9	0.8	1.8	2.0	0.8	0.6	1.1	1.2
Bankfull Max Depth	1.6	1.5	2.3	2.0	1.4	2.0	1.5	1.6	1.3	1.3	3.6	3.0	1.2	1.1	2.0	2.1
Width/Depth Ratio	20.8	14.5			14.7	7.8			9.8	11.2			21.4	21.8		

PATTERN	Jumping Run As-built - 2000				Jumping Run 2003				Jumping Run 2004			
	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4
Meander Wave Length	130	100	120-165	140	115-123	49-95	145-149	30-52	108-126	49-108	124-148	66-148
Radius of Curvature	60	33	35-84	60+	27-39	22-30	34-58	30-51	30-44	14-43	30-42	26-69
Beltwidth	-	-	-	-	35-39	36-47	43-51	25-49	32-39	29-45	38-46	20-35

PROFILE*	Jumping Run 2003 - Area 1	Jumping Run 2004 - Area 1			Jumping Run 2003 - Area 2	Jumping Run 2004 - Area 2			Jumping Run 2003 - Area 3	Jumping Run 2004 - Area 3			Jumping Run 2003 - Area 4	Jumping Run 2004 - Area 4		
	Median	Min	Max	Median	Median	Min	Max	Median	Median	Min	Max	Median	Median	Min	Max	Median
Riffle Length	20.9	31.4	68.9	49.7	11.8				23.6	17.0	38.0	27.5	17.9	15.0	52.0	34.0
Riffle Slope	1.66%	0.47%	1.05%	0.60%	1.39%	No data reported (data			1.86%	1.40%	3.29%	2.05%	1.52%	0.23%	1.62%	1.00%
Pool Length	16.9	25.0	36.0	30.5	30.0	collection error)			29.5	24.0	59.0	38.0	35.0	28.0	83.0	53.0
Pool to Pool Spacing	44.0	39.5	94.5	87.5	43.3				89.2	42.5	87.0	59.0	89.5	48.0	115.5	70.5

*Data for previous monitoring periods were not reported

SUBSTRATE	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool	
	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	2001	2004	As-built	2003	As-built	2003
d50	0.27	0.16	0.08	0.23	7.41	0.11	0.09	0.26	12.65	0.09	0.38	0.16	9.65	3.37	0.14	0.16
d84	8.09	1.07	0.14	0.44	14.03	0.7	0.15	13.65	44.9	15.91	8.87	1.95	27.3	15.43	0.56	1.29

VEGETATION	Jumping Run Area 1 - 2003		Jumping Run Area 1 - 2004		Jumping Run Area 2 - 2003		Jumping Run Area 2 - 2004		Jumping Run Area 3 - 2003		Jumping Run Area 3 - 2004		Jumping Run Area 4 - 2003		Jumping Run Area 4 - 2004	
	Quad #1		Quad #1		Quad #2		Quad #2		Quad #3		Quad #3		Quad #4		Quad #4	
	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted
Tree Stratum (trees/acre)	480	360	160	80	1080	240	160	0	1040	840	120	120	520	520	640	280
Shrub Stratum (%cover)	25	-	20	-	2.5		11		10.5	-	1	-	12	-	3	-
Herb Stratum (%cover)	143	-	110	-	115		100		206.5	-	85	-	169	-	105	-

MACROINVERTEBRATES	Upstream Reference				Site 2 - within restoration				Site 3 - below restoration			
Year of Survey	2000	2002	2003	2004	2000	2002	2003	2004	2000	2002	2003	2004
Total Taxa Richness	43	37	44	41	38	12	20	27	31	28	44	44
EPT Taxa Richness	19	20	19	20	8	3	12	11	9	7	16	16
EPT Abundance	67	88	87	88	39	7	34	39	47	28	71	54
Dominants in Common Index (%)	-	-	-	-	25%	5%	28%	30%	19%	16%	50%	60%
# Keystone taxa	10	12	14	19	2	0	5	6	4	0	6	12

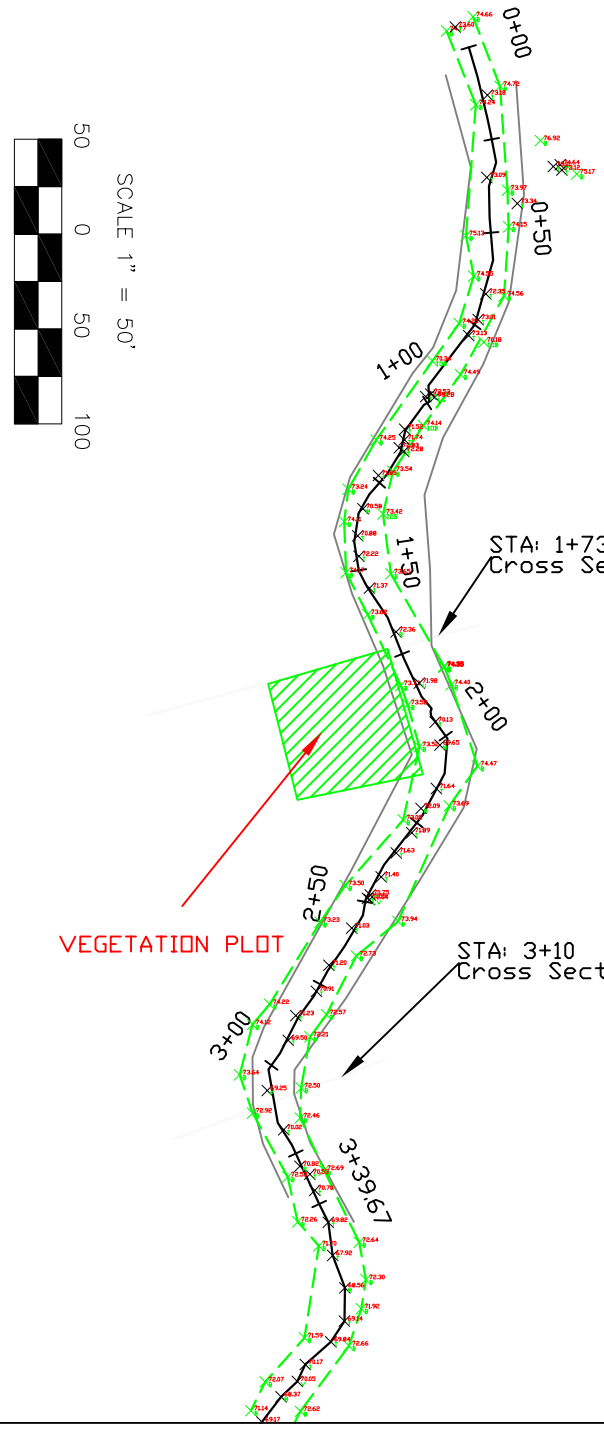
Results and Discussion

Overall, the Jumping Run Restoration Project is demonstrating excellent stability and performance. Dimension, pattern, profile, and channel materials are similar to as-built conditions and where deviations are occurring, the trend is in the positive, indicating a properly functioning system. A headcut previously noted was not evident in the field during the survey. Two cross vane structures show signs of stress and should be monitored closely in upcoming monitoring events. Reach 4 has areas that should continue to be monitored. These areas include some localized downcutting, localized bank migration and sediment laden water cutting through the buffer. Vegetation has established and is thriving in the restored conditions of the channel and riparian zone.

Benthic macroinvertebrate data have been collected from this project annually for three years following construction. Data from Jumping Run within the restored reach illustrate a rapid decline in biological integrity following construction. Many of the taxa collected during this investigation were very tolerant chironomidae. The number of taxa and the Dominant in Common analyses improved during surveys conducted in 2003 and 2004. These data mimic, to some degree, pre-construction conditions. Interestingly conditions continue to improve at Site 3 below the restoration reach. Both the number of keystone taxa and the Dominant in Common taxa increased at this site in 2004. This may be a response to the elimination of the cattle and the increased efficiency of the newly constructed riparian zone to assimilate nutrients.

The following areas of concern for 2004:

- **Piping through the structure (Issue Photo 1)**
  - A cross vane just upstream of section 2 should be monitored for changes. It is presently partially piping through the structure.
- **Downcutting in Reach 4 (See Area 4 profile graph)**
  - Two areas of bed downcutting had occurred since construction (betweens stations 0+40 and 0+70 and 3+50 and 4+00). These areas should be watched closely in upcoming monitoring events.
- **Right bank migration on pool cross-section in area 4 (See Area 4 Cross-section)**
  - The bank has migrated over the past two monitoring periods. This area should be watched closely to ensure bank stability in upcoming monitoring events.
- **Toe scour at riffle cross-section in area 4 (See Area 4 Cross-section)**
  - Scour along the right bank toe should be watched closely to ensure bank stability in upcoming monitoring events.
- **Sediment laden water cutting through buffer in Area 4 (Issue Photo 3)**
  - Concentrated sediment laden water cutting through the buffer. The path has formed into a small gully. The source of the water is the cow pasture adjacent to the project. The water is likely carrying significant amount of nutrients as well as sediment. This should be monitored to see if the problem continues. A level spreader may be necessary stop the short cutting of the buffer.
  - Station: End of Area 4.
- **Vegetation**
  - Plantings are currently below minimum requirements (120 stems/acre planted and 270 stems/acre total including volunteer species). Supplemental planting should be considered.



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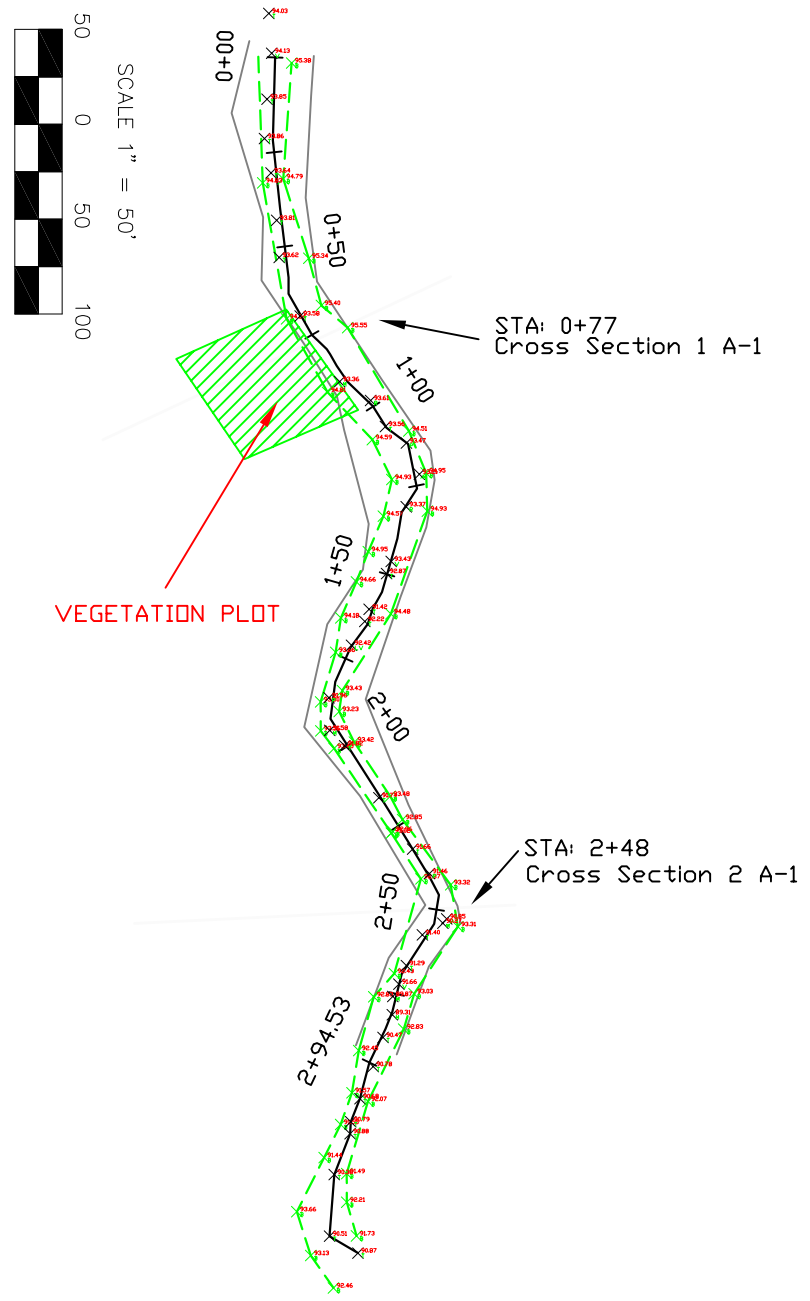

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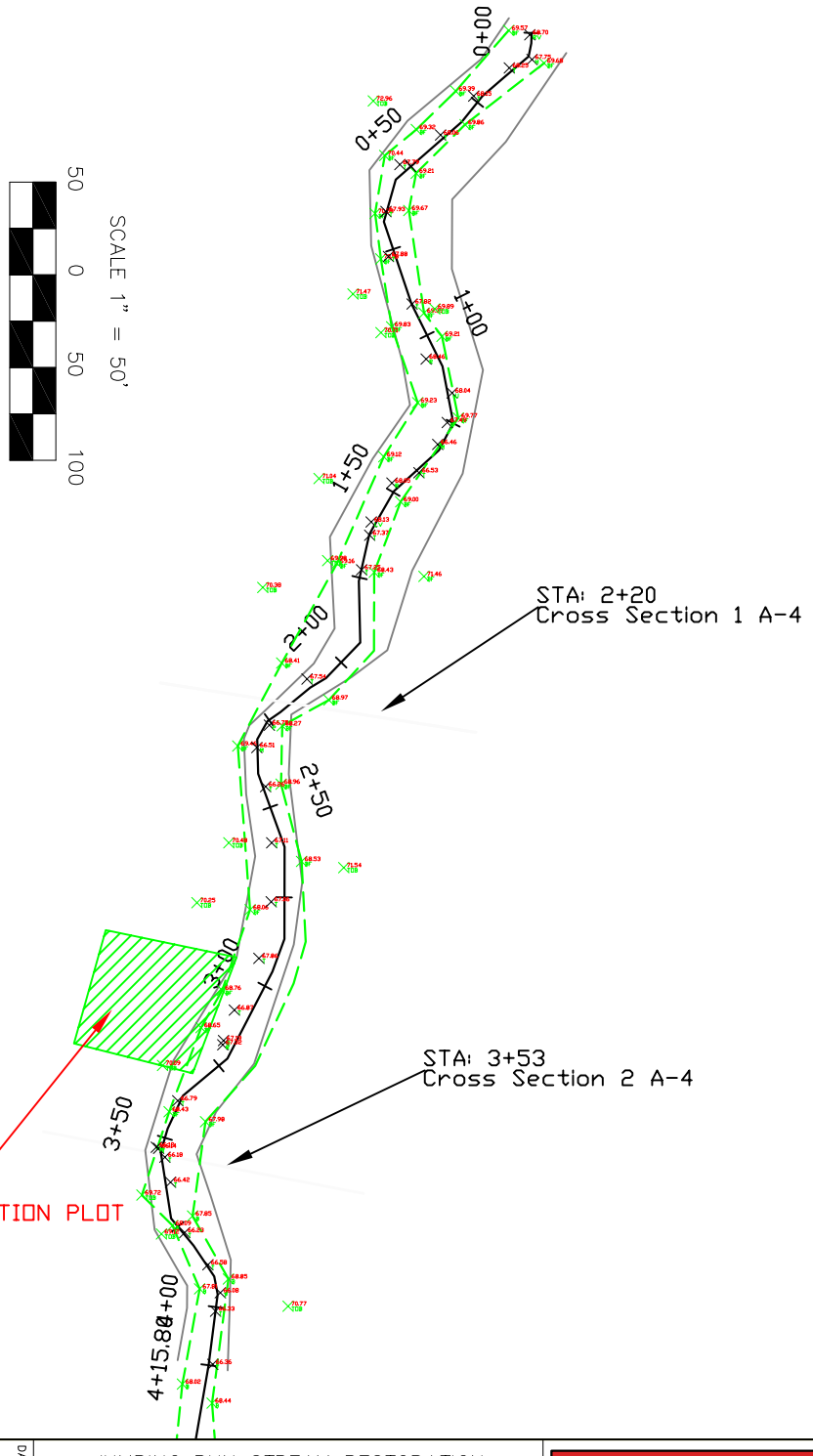

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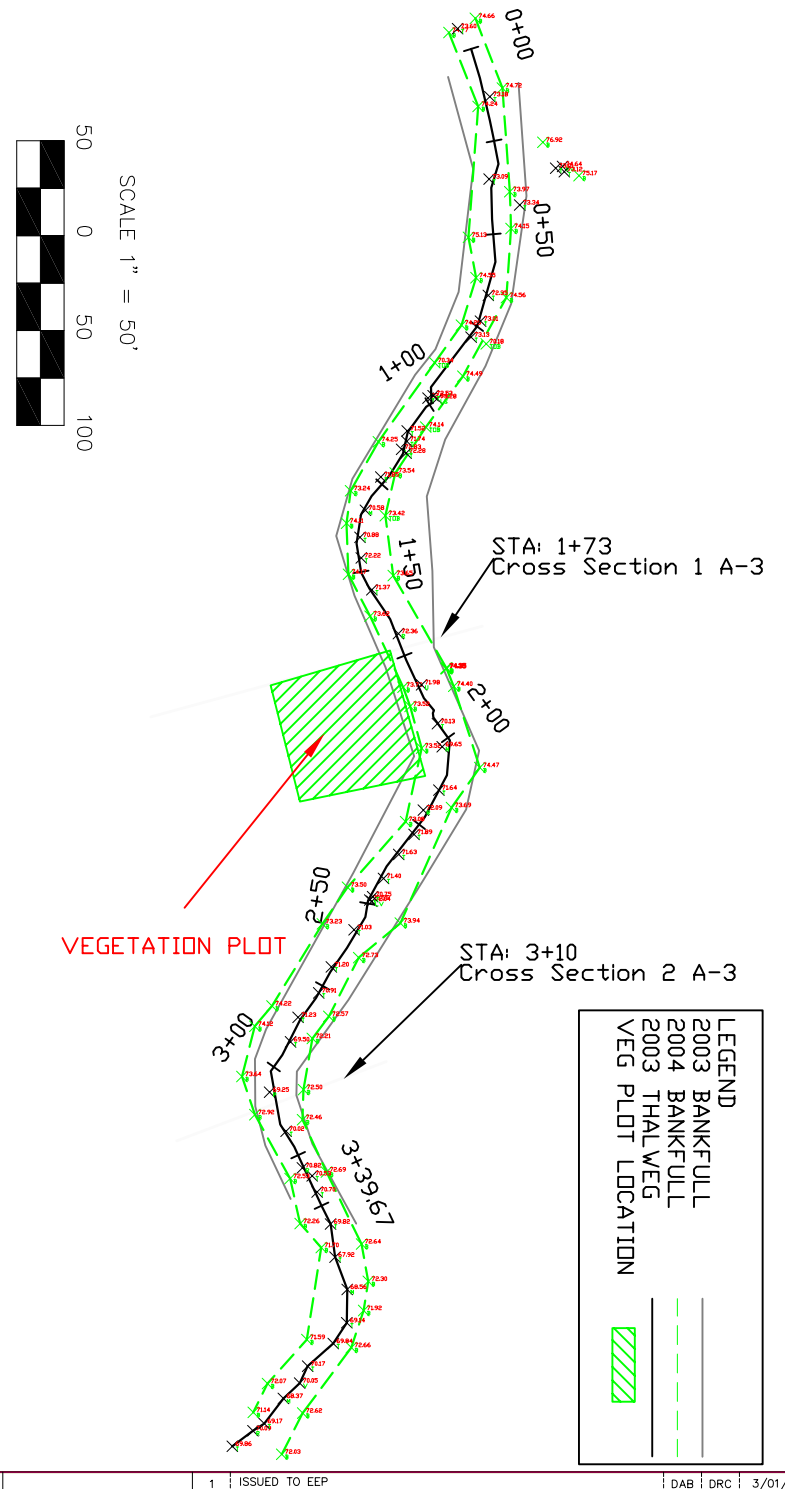

AREA 2

JUMPING RUN STREAM RESTORATION
ALEXANDER, N.C.
ECOSYSTEM ENHANCEMENT PROGRAM

FIGURE
2004 MONITORING PLAN VEIW

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BIOLOGICAL & AGRICULTURAL ENGINEERING
Weaver Labs Campus Box 7625
North Carolina State University
Raleigh, NC 27695

NO	REVISIONS	DRN	CHK	DATE
1	ISSUED TO EEP	DAB	DRC	3/01/05

DRAWING NO.
SHEET NO. C - 1
FILENAME PAYNE DAIRY.DWG
PROJECT NO.
DATE 3/01/2005

Photos

The following are photographs of typical sections and areas of concern throughout the project.

Typical Pool

Typical Riffle

Issue Photo 1. Piping through structure Station: Just upstream of Area 2.

Issue Photo 2. Slumped cross vane arm. Located just upstream of Paul Payne Road culvert. A cross vane 20 feet downstream is holding grade.

Issue Photo 3. Concentrated sediment laden water cutting through the buffer. Station: End of Area 4.

Table of Contents

Tables and Figures

1.0 BACKGROUND INFORMATION

This project is located within the limits of the Payne Dairy Farm in Alexander County. Drainage area at the outlet is 2.2 sq. mi. at the end of Area 4 (at the end of the project) and 1.2 square miles at SR-1614. The project was completed in 2001 with an as-built survey completed in June of 2001. Additional background information for this report was not provided at the time of completion. Please refer to prior documentation for background information.

1.1 Goals and Objective

The goals and objectives of this project are as follows:

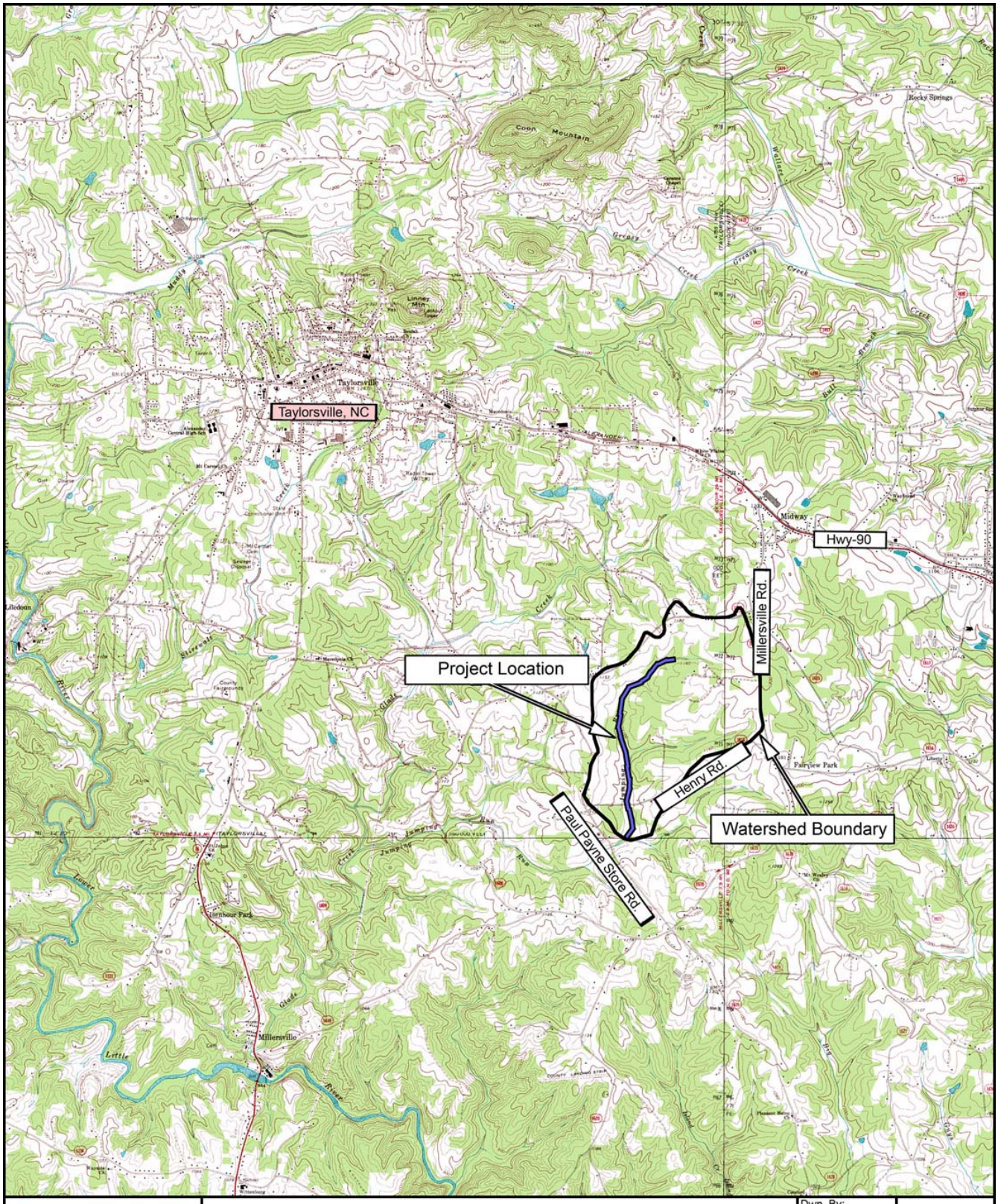
1.) Restore 5,177-linear feet of Jumping Run Creek through dimension, pattern and profile adjustments.
2.) Restore 470-linear feet of Jumping Run Creek through dimension and profile adjustments and cattle exclusion.
3.) Establish a riparian zone surrounding restored sections of Jumping Run Creek, an additional 1,350-linear feet of Jumping run, and 1,350-linear feet of a tributary.
4.) Improve the habitat within the channel and the riparian zone.

1.2 Project Location

This project is located southeast of Taylorsville in Alexander County. From Statesville, follow Interstate I-64 west to Millersville road. Turn left (south) on Millersville road and follow to Henry Road. Turn right (west) on Henry Road until it dead ends with Paul Payne Store Road. Turn right on Paul Payne Store Road and follow to the top of the hill. At the op of the hill turn right onto a field road. The beginning of the project is located at the bottom of the hill. Please note that this is a private residence and permission is suggested prior to entering the site.

1.3 Project Description

A previously impaired stream flowing through a cow pasture, Jumping Run Creek was restored using channel dimension, pattern, and profile modifications and the establishment of riparian zone adjacent to the creek. Channel profile is maintained through the use of log and rock cross vanes. Channel pattern is maintained through the use of root wads and vegetation along the channel banks. Easement boundaries are maintained with fencing.



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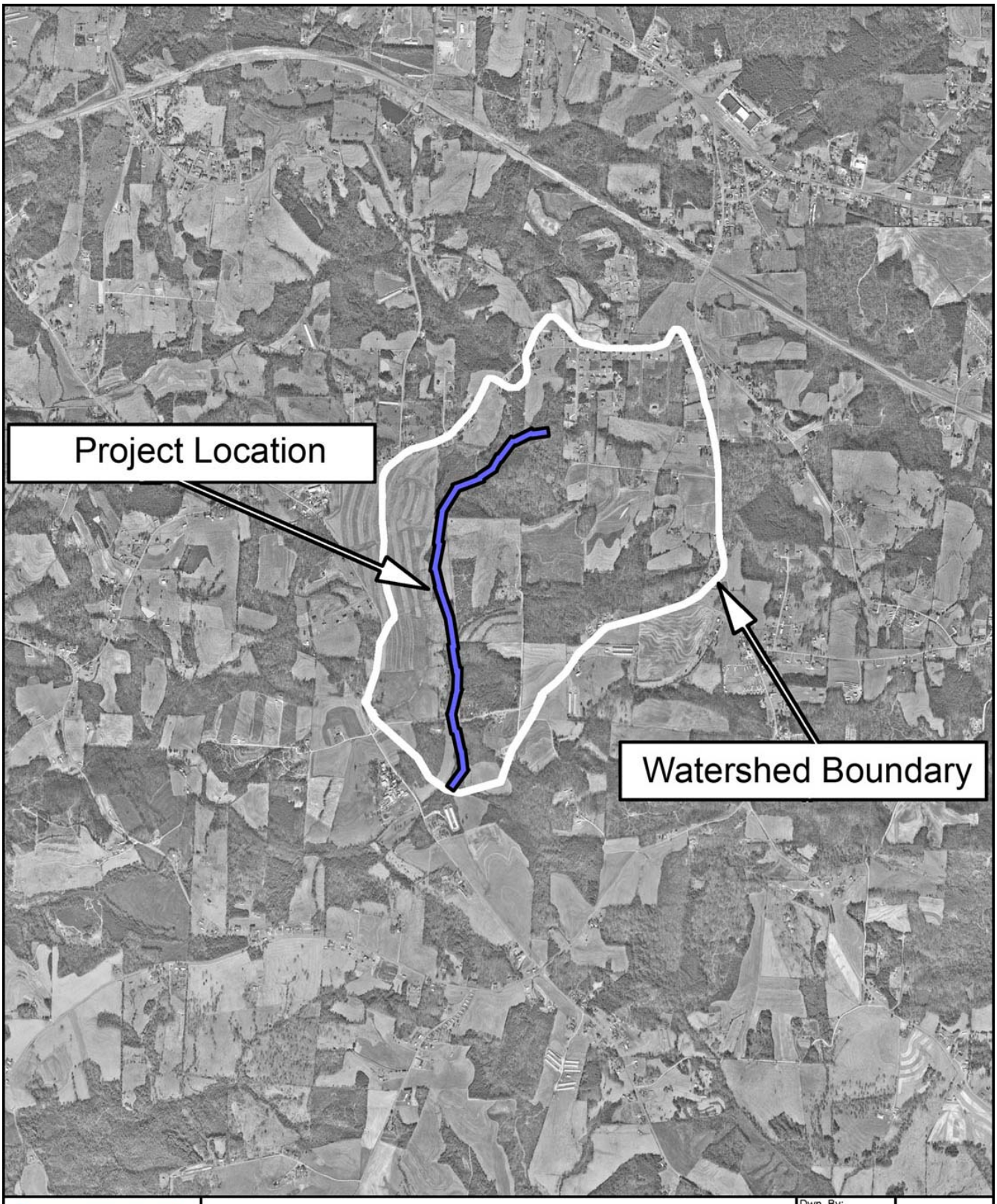
Project Location: Jumping Run

Axelander County, North Carolina

EEP Monitoring Report

Dwn. By:	MVH
Ckd By:	DAB
Date:	March 2004

FIGURE 1



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Aerial Watershed Photo:Jumping Run

Alexander County, North Carolina

EEP Monitoring Report

SCALE 1:30,000

0 1 MILE

0 1000 2000 3000 4000 5000 FEET

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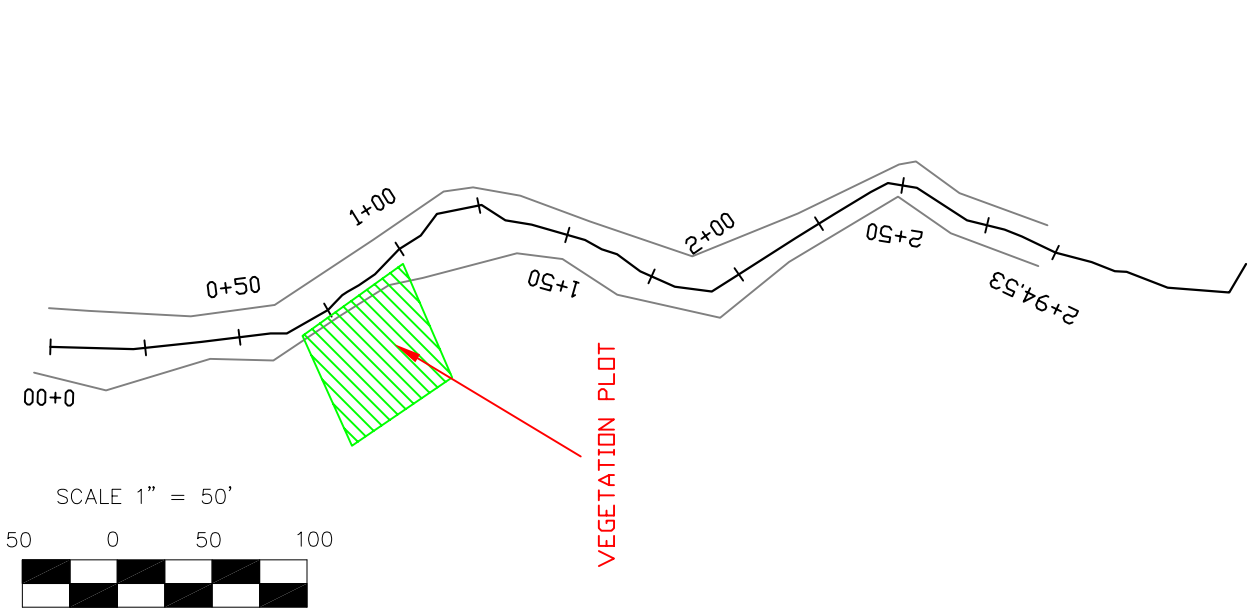
Dwn. By: MVH

Ckd By: DAB

Date: March 2004

FIGURE 2



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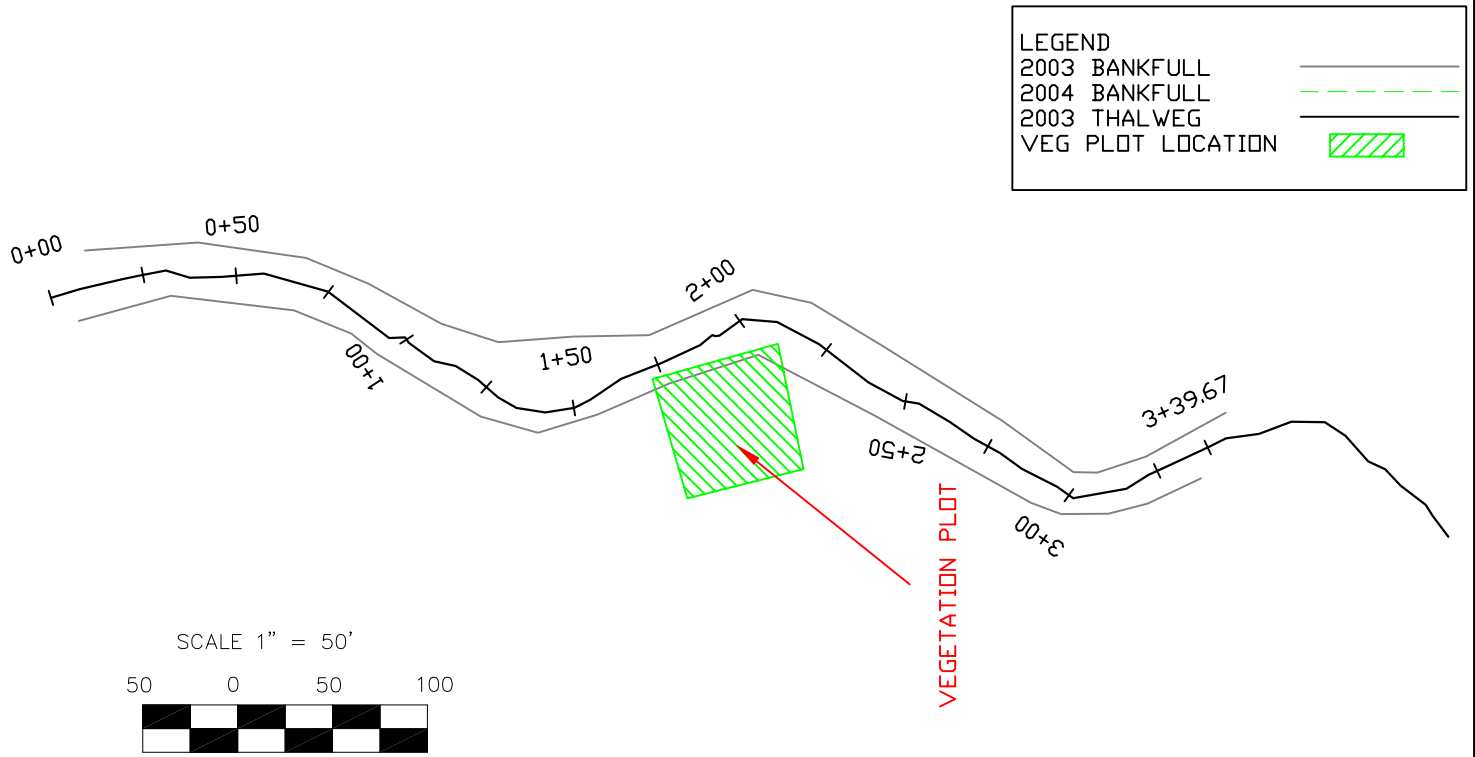

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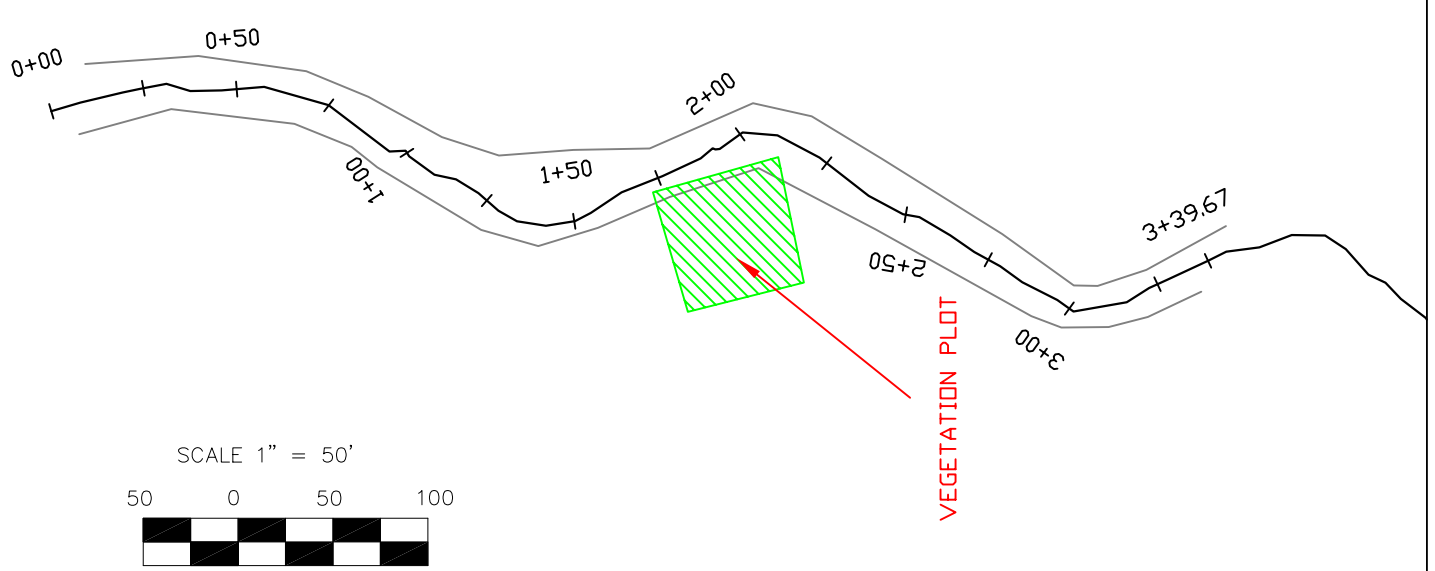
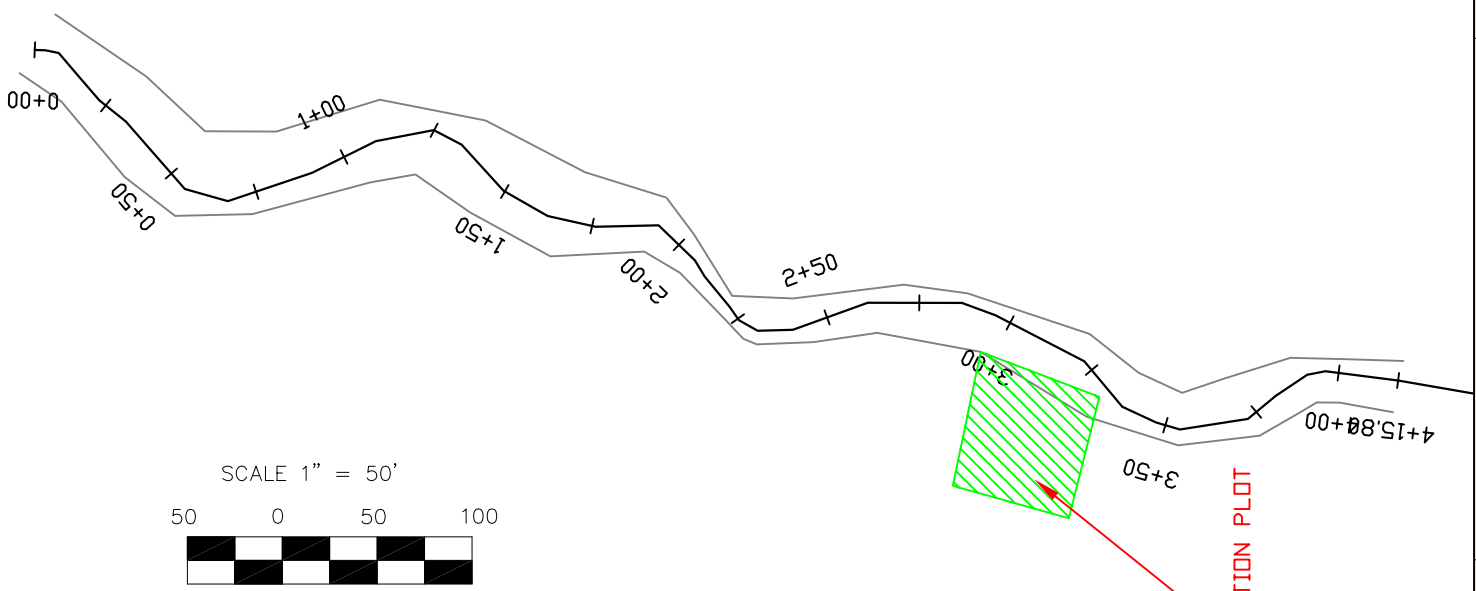


AREA 3



AREA 4

NO	REVISIONS	DRN	CHK	DATE
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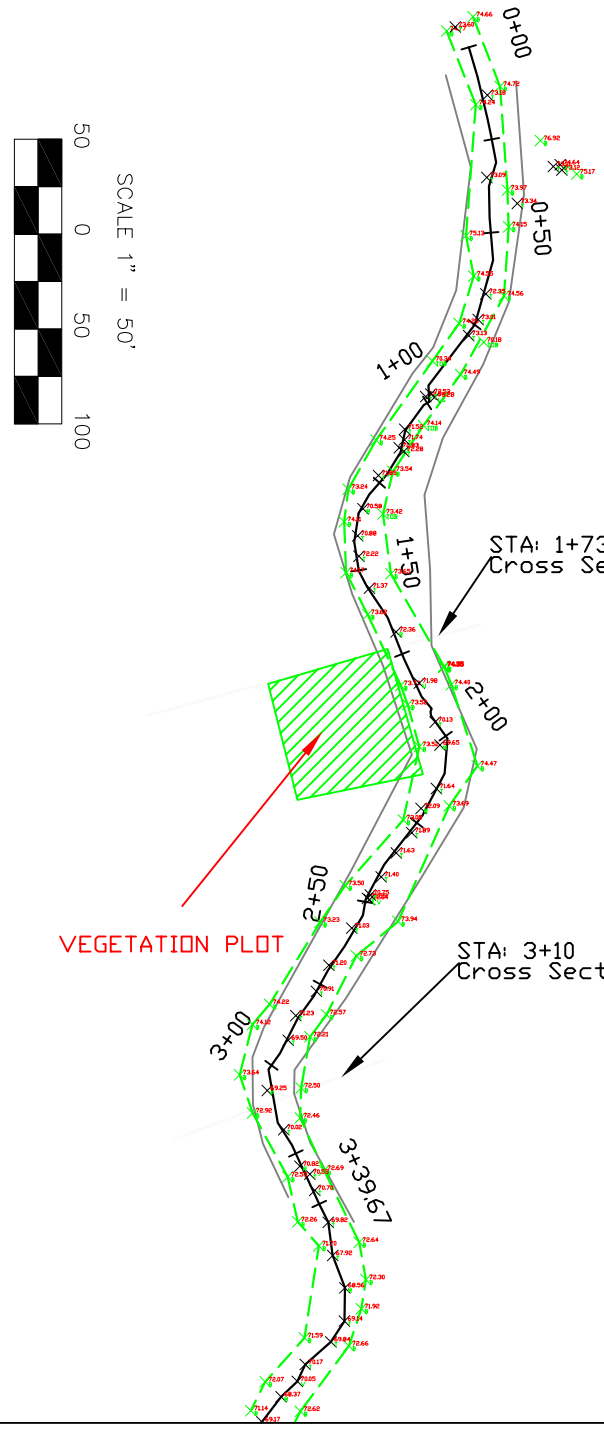
FIGURE
AS-BUILT MONITORING PLAN VEIW

DATE	3/01/2005
PROJECT NO.	
FILENAME	PAYNE DAIRY.DWG
SHEET NO.	C - 1
DRAWING NO.	



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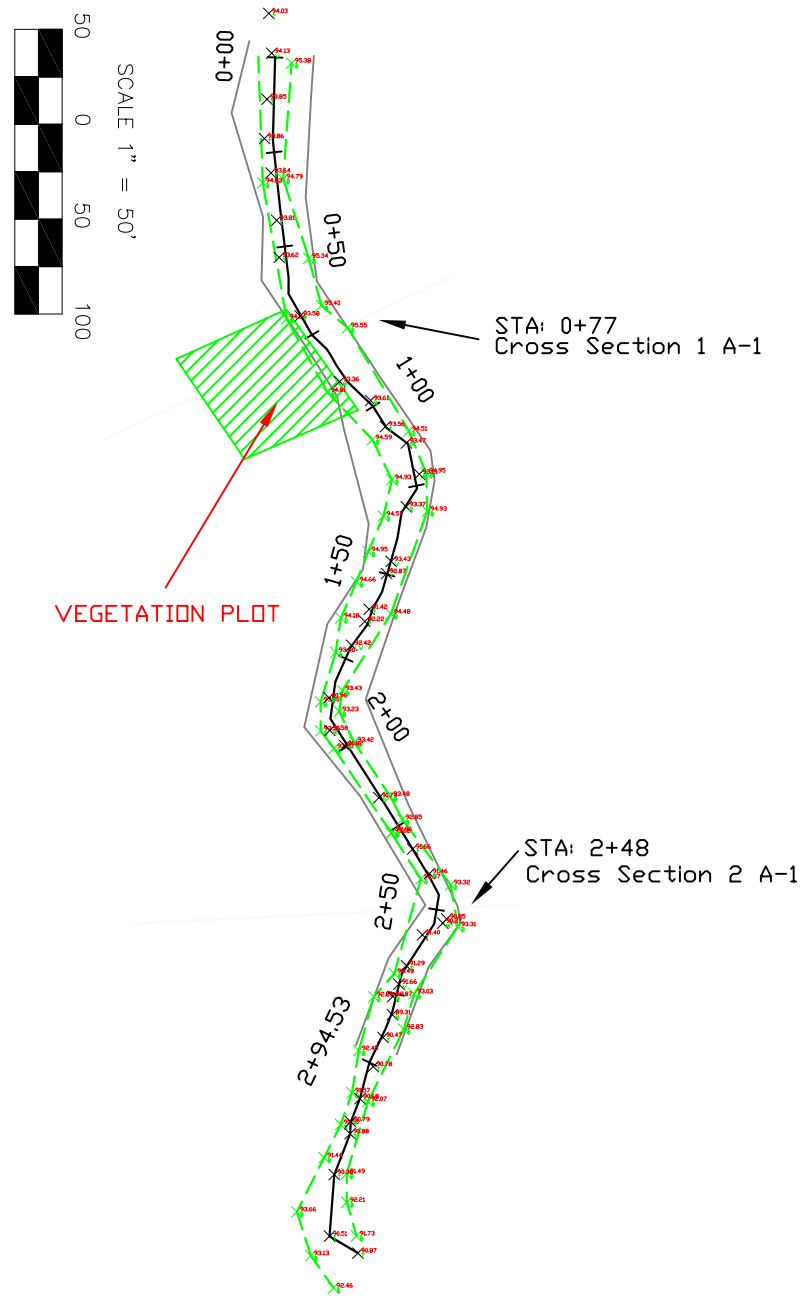

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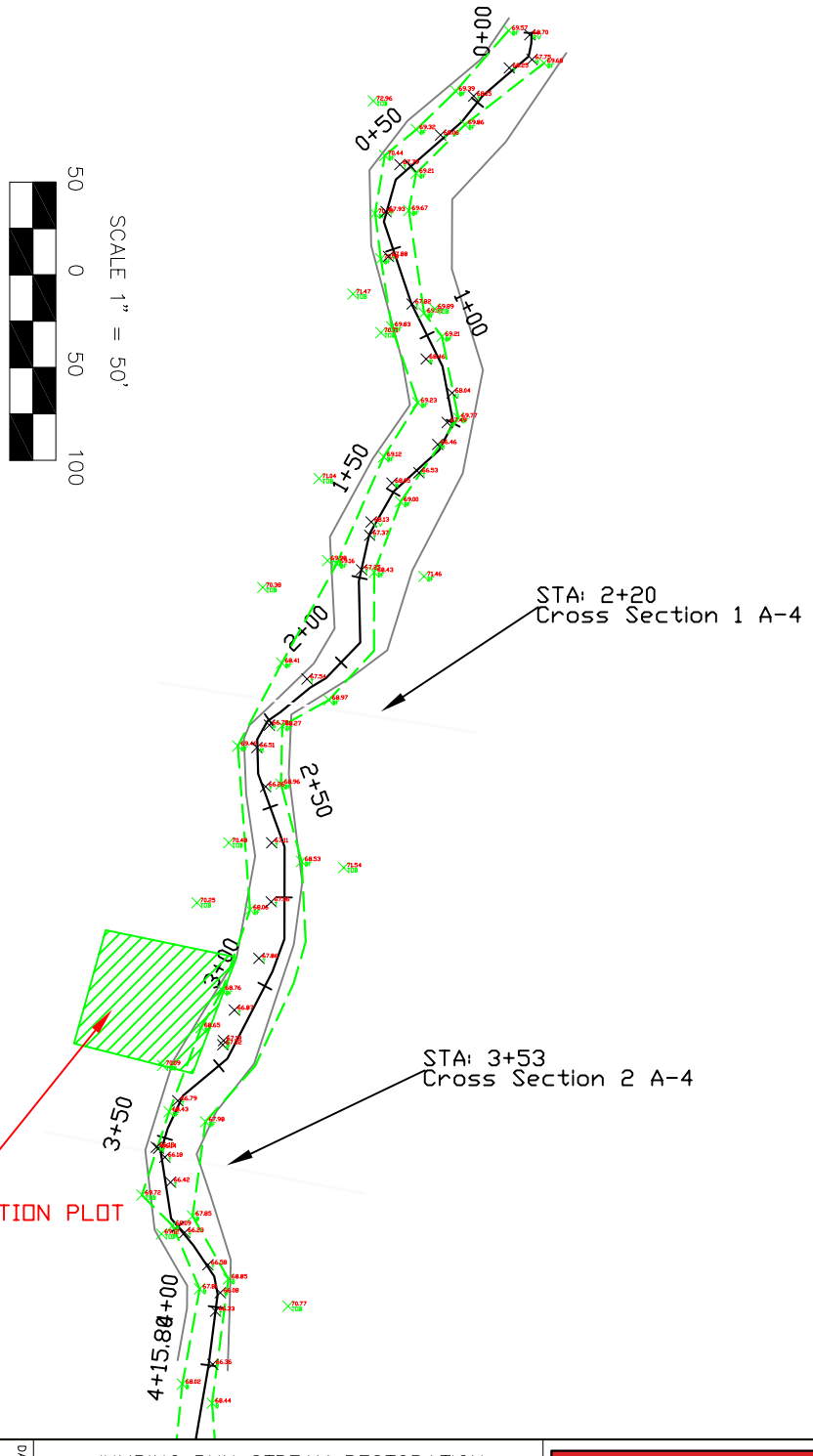

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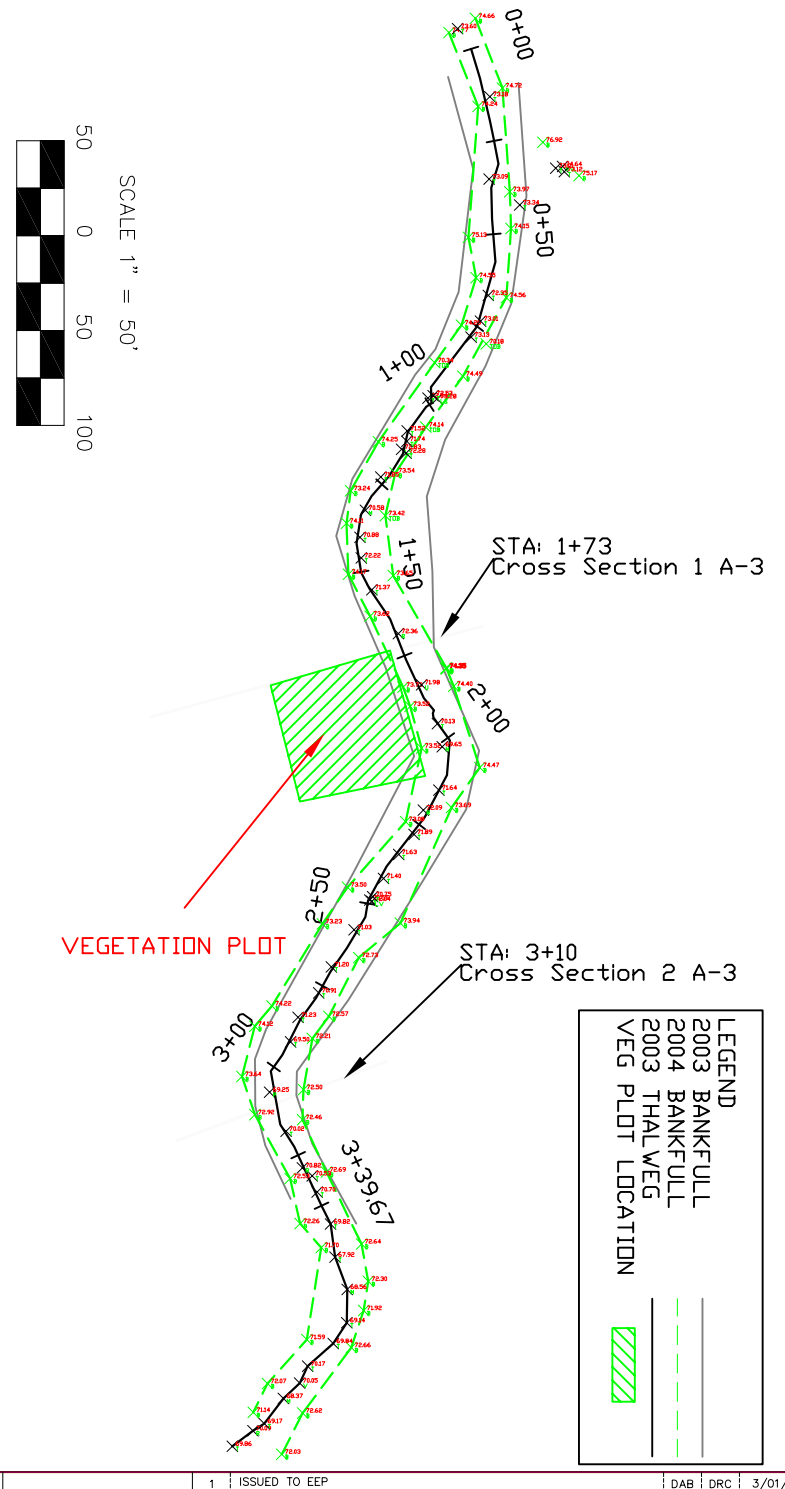

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2.0 YEAR 2004 RESULTS AND DISCUSSION

Year 2004 monitoring results are shown for Jumping Run monitoring.

2.1 Vegetation

The following describes the results of 2004 vegetation monitoring conducted at the Jumping Run Restoration Site. Sampling and analysis methods used can be found in the appendix. Modifications to those methods are described below. Using the Draft Vegetation Monitoring Plan for NCWRP Riparian Buffer and Wetland Restoration Projects, 4 vegetation monitoring plots located within the riparian buffer of the Payne Dairy Stream Restoration project were resurveyed. Because of several flood events during the year, plots 1, 3, and 4 had to be realigned or moved due to washouts. No reference area was studied; therefore no comparisons could be made to reference conditions.

2.1.1 Results and Discussion

Vegetation within the riparian buffer of Jumping Run Creek is overall considered successful. The herbaceous layer is well established and diverse. *Panicum virgatum* (switchgrass), *Juncus* spp. (rushes) and *Carex* spp. (sedges) were most notably dominant throughout. Herbaceous vegetation can be considered extremely thick, perhaps to the detriment of naturally regenerating shrubs and trees. Streambanks and floodplain areas were well covered with herbaceous plants at time of surveying. Shrub species, particularly those sprouting from livestakes appeared to be performing well. In the majority of areas where livestakes were planted, they were alive and growing. *Salix nigra* (black willow) seems to be performing exceptionally well throughout the entire project area. There is also a large number of naturally regeneration shrub species throughout the project area where herbaceous vegetation is not dense. Several clumps of shrubs appear to be transplanted during construction. These continue to appear healthy and vigorous.

Extrapolation from the four plots resulted in an overall average of approximately 120 planted trees per acre for this restoration site. If natural regeneration is included with planted trees, the number is increased to an average of approximately 270 trees per acre. Both of these estimates are based on a diverse mix of species as well. Natural regeneration obviously plays an important role in the restoration of this site, although natural regeneration numbers were not as high as expected.

Microstegium vimineum was the only major invasive exotic plant located within these areas. *Festuca* sp. (Fescue) was prevalent in the adjacent fields surrounding the buffer; however, the native herbaceous vegetation seemed to be well established in the majority of the project site. Only a few areas contained the fescue. Chinese Privet (*Ligustrum sinense)* was also seen in limited locations throughout the site and should be monitored as well. Native herbaceous vegetation appears to be out competing the fescue and microstegium in most areas.

Recommendations include planting more trees to meet mitigation requirements and live stakes in areas where bare areas exist along the channel banks. The invasive vegetation

should also be monitored over time to determine if it will be a limiting factor in native plant growth in the future. No treatment is recommended at this time.

2.2 Morphology

Restored channel dimension, pattern, profile and substrate were examined during the 2004 monitoring. Methodology used for data collection can be found in the appendix. Deviations from those methods are detailed below. The entire data set can be found in the appendix.

2.2.1 Results and Discussion

Area 1

Channel profile along area 1 of Jumping Run remained similar to 2003 survey. The headcut previously discussed in prior reports appears to have stabilized. The upper end of the reach (station 0+0 to 1+50) has a decrease in bedform and has slightly aggraded. This area should be closely examined in upcoming monitoring events. Vegetation dominating the channel banks is maintaining stability through the reach.

Channel cross sections remain very stable. Cross-sectional area has decreased in both, the riffle and the pool. Decrease in area is likely due to dense vegetation lining the channel banks. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly.

Riffle channel materials, although finer then as-built conditions, are slightly coarser then 2003 conditions. Gravel appears more dominant throughout the reach. Pool channel materials are coarser then as-built conditions but have become finer for the past three years. The channel appears to be transporting the sediment load delivered to it by its watershed.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks. There are no areas of visible meander migrations throughout this reach.

Area 2

Channel profile along area 2 of Jumping Run has remained similar to as-built conditions. Riffles appear to be maintaining grade and pools are maintaining there max depth. No downcutting or headcuts are evident in this section. Profile survey results from this reach are unavailable due to unrecoverable data error. Cross-sections were resurveyed and verify channel grade has not changed since 2003 survey. Pools and riffles are in the appropriate locations in the plan form and do not appear to have changed much over the past year.

Channel cross sections remain very stable. Both sections had a reduction in cross-sectional area. The dense vegetation is capturing sediment washing through the reach, narrowing the channel throughout the reach. The pool is narrowing by building the point bar. The maximum depth is similar to 2003 conditions.

Riffle channel materials are finer then as-built conditions but the reduction in d50 is less then previous years. Coarse material in the form of coarse sand is dominating the channel bed. Pool channel materials are coarser then as-built conditions and are similar to 2002 conditions.

Channel pattern appears to have been maintained since construction. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks. There are no areas of visible meander migrations throughout this reach.

Area 3

Channel profile along area 3 of Jumping Run has remained similar to as-built conditions. Riffles appear to be maintaining grade and pools are maintaining their max depth and location. No down-cutting or head cuts are evident in this section.

Channel cross sections remain very stable. As with the other study cross-sections, cross-sectional area continues to decrease. The ample floodplain area is being accessed frequently, allowing deposition occur along the channel banks. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly. Vegetation is stabilizing the banks in both sections.

Riffle channel materials at cross section #1 were similar to 2003 conditions and continue to be finer then as-built conditions. Sands dominate the bed but gravel remains present. Pool cross-section substrate was similar to 2003 conditions and remain finer then as-built conditions.

Channel pattern appears to have been maintained since construction. Plan from measurements are very similar to 2003 data. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks. There are no areas of visible meander migrations throughout this reach.

Below area #3, a cross vane had previously been cut through and the left arm had slumped. Although water was still cutting around the structure to the left, vegetation has established and the near bank area is aggrading slightly. A structure 20 feet downstream is doing an excellent job of holding grade so there is little risk of head cutting. No degradation has occurred in this area over the past two years. This are will be monitored closely in future monitoring periods.

Area 4

Channel profile along area 4 of Jumping Run remained similar to as-built conditions. The pool at station 0+60 in now a run or flat riffle and a short section of downcutting has occurred between stations 3+50 and 4+00 but appears to be localized. Riffles throughout the middle part of the reach are being maintained. Profile appeared to be properly formed. Upcoming monitoring should examine this area closely to see if the downcutting expands. Pools are maintaining depth and location. Vegetation dominating the channel banks is helping to maintain bank stability.

Riffle cross-section area has remained similar to 2003 measurements. A small decrease in cross-sectional area has occurred as the left bank continues to aggrade. Toe scour along the right bank should be monitored in following years although the dense vegetation along the channel bank makes significant erosion unlikely. The pool cross-section slightly increased in area since 2003. This is due to some right bank migration. Right bank scour was noticed in 2003. The bank has migrated 0.7 feet over the past year. This appears to be relatively localized due to the dense vegetation lining the channel bank. Upcoming monitoring should examine this area closely to see if the migration continues. Overall, this reach remains very stable. Maximum depth is consistent to as-built conditions and the entire reach appears to be functioning properly.

Data collected on channel materials was unrecovered prior to preparing this report; therefore, visual assessment is used. Channel material appears similar to previous conditions. Coarse gravel dominates the riffle bed and pools remain sandy. Previous surveys have not indicated any potential problems with bed material condition and 2004 visual inspections were consistent with those observations.

Channel pattern appears to have been maintained since construction. Plan form measurements are very similar to 2003 data. Dense vegetation has established along the channel banks. This vegetation is providing an excellent root mass to stabilize the banks. There are no areas of visible meander migrations throughout this reach.

Table 1. Summary of Results

DIMENSION	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Riffle		Pool		Riffle		Pool		Riffle		Pool		Riffle		Pool	
	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004
Bankfull Cross-sectional Area	9.4	6.6	19.2	11.2	9.0	7.8	12.8	7.2	8.3	6.8	27.1	25.3	13.5	8.3	15.9	14.9
Bankfull Width	14.0	9.8	16.0	9.7	11.5	7.8	13.7	8.7	9.0	8.7	15.0	12.9	17.0	13.5	14.0	12.9
Bankfull Mean Depth	0.7	0.7	1.2	1.2	0.8	1.0	0.9	0.8	0.9	0.8	1.8	2.0	0.8	0.6	1.1	1.2
Bankfull Max Depth	1.6	1.5	2.3	2.0	1.4	2.0	1.5	1.6	1.3	1.3	3.6	3.0	1.2	1.1	2.0	2.1
Width/Depth Ratio	20.8	14.5			14.7	7.8			9.8	11.2			21.4	21.8		

PATTERN	Jumping Run As-built - 2000				Jumping Run 2003				Jumping Run 2004			
	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4	Area 1	Area 2	Area 3	Area 4
Meander Wave Length	130	100	120-165	140	115-123	49-95	145-149	30-52	108-126	49-108	124-148	66-148
Radius of Curvature	60	33	35-84	60+	27-39	22-30	34-58	30-51	30-44	14-43	30-42	26-69
Beltwidth	-	-	-	-	35-39	36-47	43-51	25-49	32-39	29-45	38-46	20-35

PROFILE*	umping Rur 2003 - Area	Jumping Run 2004 - Area 1			Jumping Run 2003 - Area	Jumping Run 2004 - Area 2			Jumping Run 2003 - Area	Jumping Run 2004 - Area 3			Jumping Run 2003 - Area	Jumping Run 2004 - Area 4		
	Median	Min	Max	Median	Median	Min	Max	Median	Median	Min	Max	Median	Median	Min	Max	Median
Riffle Length	20.9	31.4	68.9	49.7	11.8				23.6	17.0	38.0	27.5	17.9	15.0	52.0	34.0
Riffle Slope	1.66%	0.47%	1.05%	0.60%	1.39%	No data reported (data collection error)			1.86%	1.40%	3.29%	2.05%	1.52%	0.23%	1.62%	1.00%
Pool Length	16.9	25.0	36.0	30.5	30.0				29.5	24.0	59.0	38.0	35.0	28.0	83.0	53.0
Pool to Pool Spacing	44.0	39.5	94.5	87.5	43.3				89.2	42.5	87.0	59.0	89.5	48.0	115.5	70.5

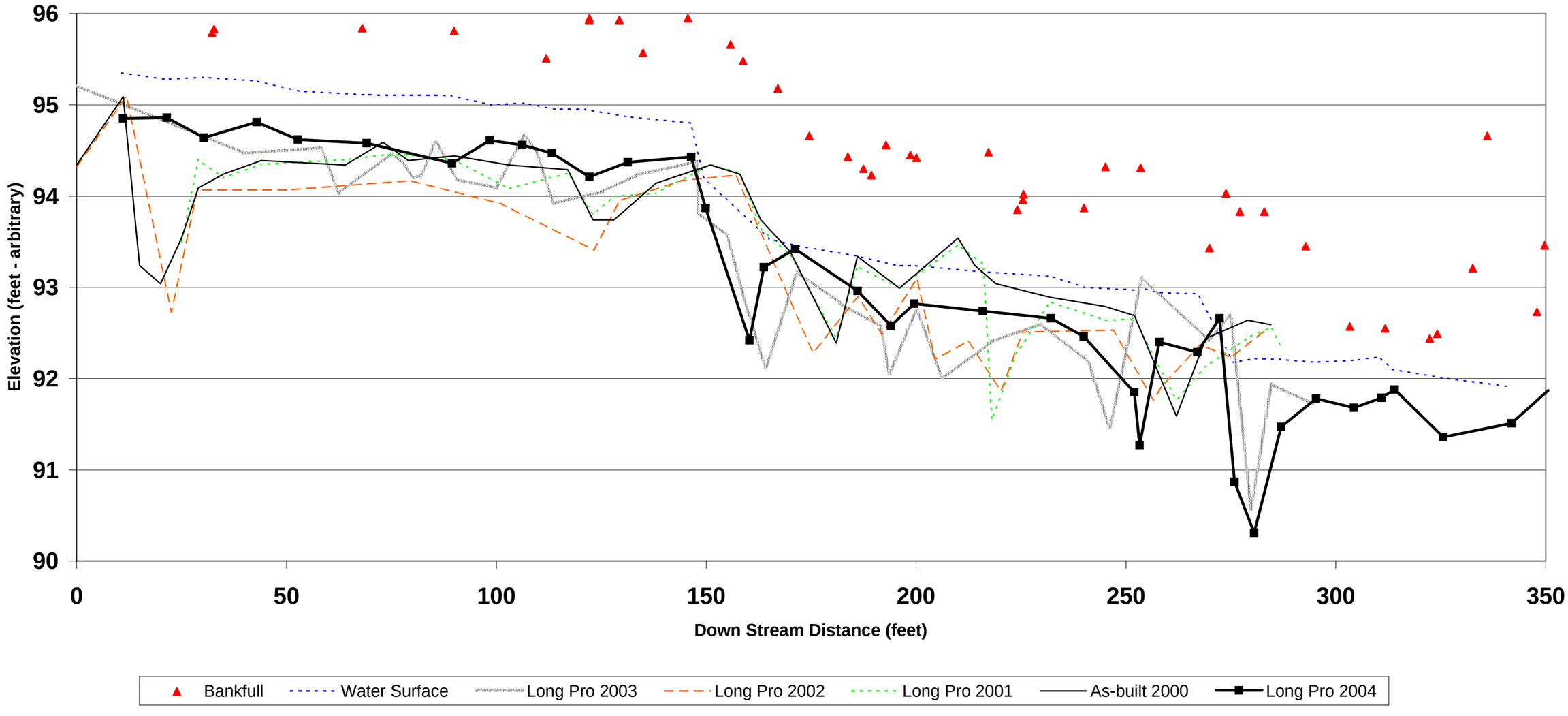
*Data for previous monitoring periods were not reported

SUBSTRATE	Jumping Run Area #1				Jumping Run Area #2				Jumping Run Area #3				Jumping Run Area #4			
	Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool		Cross-section #1 Riffle		Cross-section #2 Pool	
	As-built	2004	As-built	2004	As-built	2004	As-built	2004	As-built	2004	2001	2004	As-built	2003	As-built	2003
d50	0.27	0.16	0.08	0.23	7.41	0.11	0.09	0.26	12.65	0.09	0.38	0.16	9.65	3.37	0.14	0.16
d84	8.09	1.07	0.14	0.44	14.03	0.7	0.15	13.65	44.9	15.91	8.87	1.95	27.3	15.43	0.56	1.29

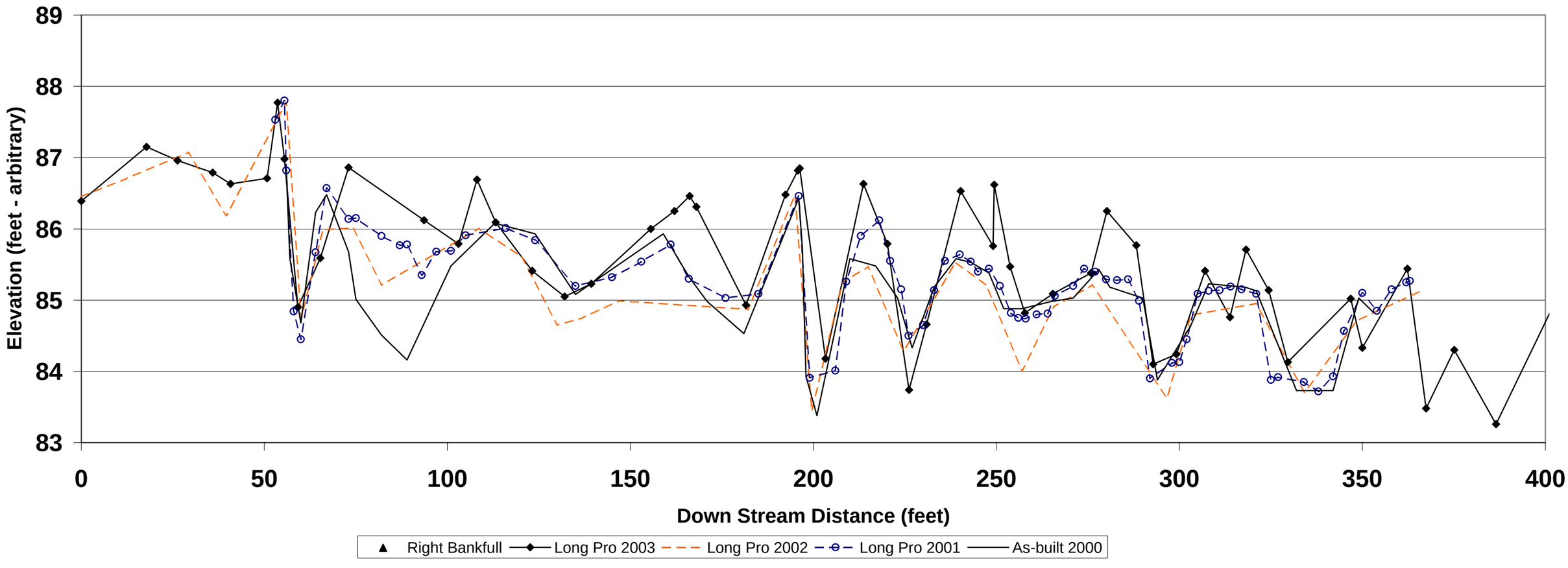
VEGETATION	Jumping Run Area 1 - 2003		Jumping Run Area 1 - 2004		Jumping Run Area 2 - 2003		Jumping Run Area 2 - 2004		Jumping Run Area 3 - 2003		Jumping Run Area 3 - 2004		Jumping Run Area 4 - 2003		Jumping Run Area 4 - 2004	
	Quad #1		Quad #1		Quad #2		Quad #2		Quad #3		Quad #3		Quad #4		Quad #4	
	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted	Observed	Planted
Tree Stratum (trees/acre)	480	360	160	80	1080	240	160	0	1040	840	120	120	520	520	640	280
Shrub Stratum (%cover)	25	-	20	-	2.5		11		10.5	-	1	-	12	-	3	-
Herb Stratum (%cover)	143	-	110	-	115		100		206.5	-	85	-	169	-	105	-

MACROINVERTEBRATES	Upstream Reference				Site 2 - within restoration				Site 3 - below restoration			
Year of Survey	2000	2002	2003	2004	2000	2002	2003	2004	2000	2002	2003	2004
Total Taxa Richness	43	37	44	41	38	12	20	27	31	28	44	44
EPT Taxa Richness	19	20	19	20	8	3	12	11	9	7	16	16
EPT Abundance	67	88	87	88	39	7	34	39	47	28	71	54
Dominants in Common Index (%)	-	-	-	-	25%	5%	28%	30%	19%	16%	50%	60%
# Keystone taxa	10	12	14	19	2	0	5	6	4	0	6	12

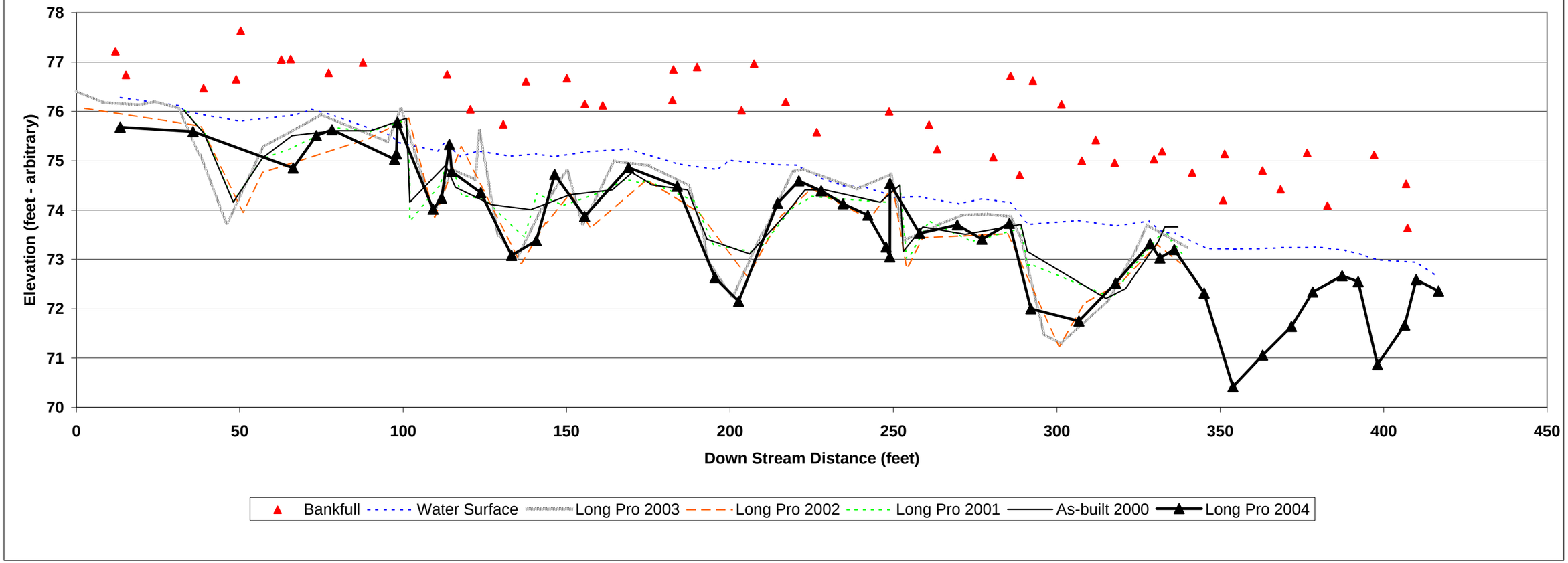
Jumping Run Creek
Longitudinal Profile
2004 - Area #1



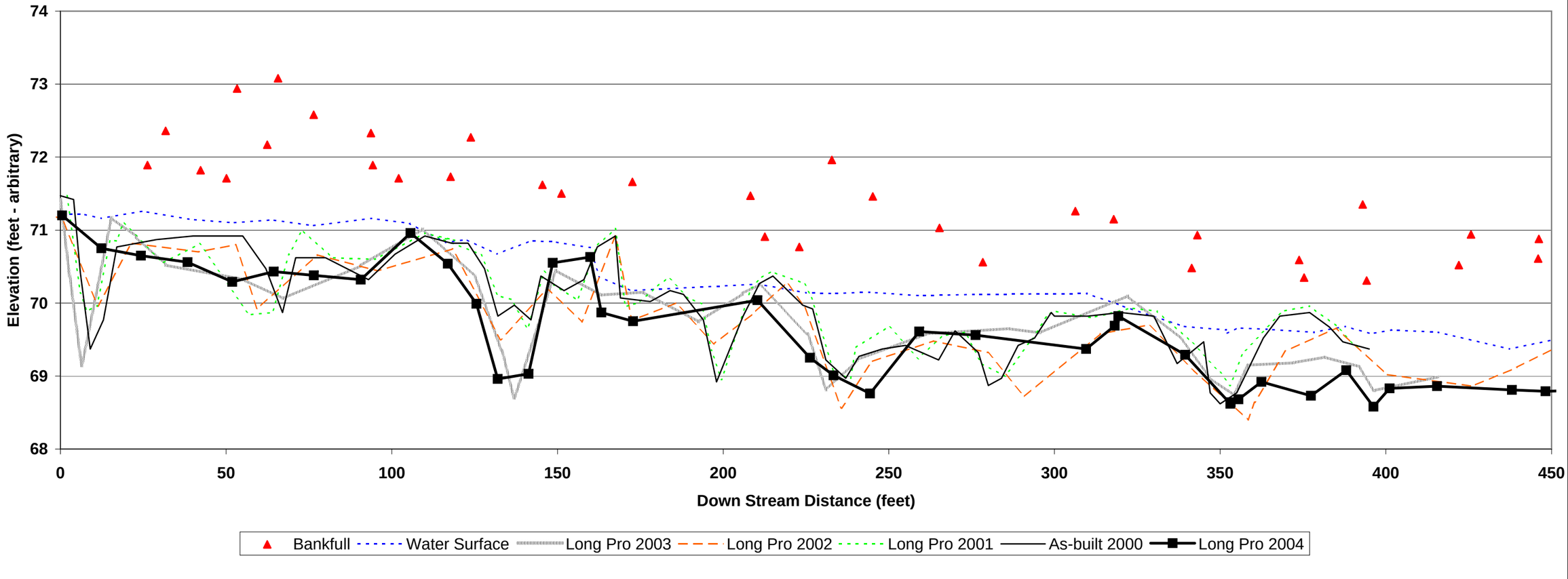
Jumping Run Creek
Longitudinal Profile
Area #2



Jumping Run Creek
Longitudinal Profile
2004 - Area #3



Jumping Run Creek
Longitudinal Profile
2004 - Area #4



2.3 Benthic Macroinvertebrates Results

Benthic macroinvertebrates samples were collected from three locations in this project to assess the restoration of Jumping Run Creek. Qual-4 collections were used at all locations and the organic/inorganic fractions of the collections were kept separate during the 2004 investigation. Station 1 is located above the restoration project in a relatively stable reach of Jumping Run Creek (approximately 3-4 riffles above the fence that marks the property line), although there is some sedimentation and bank erosion at this location. The catchment above this location contains mostly pasture and has some stormwater from residential development. Station 2 is located approximately 50 meters above SR 1614 and is within the reach of Jumping Run Creek that was restored. The stream was very unstable at this point with cattle access prior to construction. Following restoration herbaceous vegetation dominated the riparian canopy. Sand and silt dominated the substrate at this location, bank erosion was severe and the canopy has been reduced or eliminated in some places. Also it appears that this reach of Jumping Run Creek has been channelized in the past. Station 3 is below a UT of Jumping Run Creek, which drains the farm property. Jumping Run Creek at this point appeared to be more stable and had a much wider riparian zone. Cattle had access to this reach prior to restoration and Physella (an air breathing snail) was very abundant at this location, suggesting accumulation of fine particulate organic material (FPOM) and occasional low DO values dominated the benthos prior to restoration. The data in table 4 summarize the data from these three locations during pre-construction (2000) and two post-construction surveys (2002 and 2003). Additional information will be collected from this project in October 2004.

Table 2. Benthic Summary Statistics from the stream restoration project at Payne Dairy.

	Upstream Reference				Site 2				Site 3			
Year of Survey	2000	2002	2003	2004	2000	2002	2003	2004	2000	2002	2003	2004
Total Taxa Richness	43	37	44	41	38	**12**	20	27	31	28	44	44
EPT Taxa Richness	19	20	19	20	8	**3**	12	11	9	7	16	16
EPT Abundance	67	88	87	88	39	**7**	34	39	47	28	71	54
Dominants in Common Index (%)	-	-	-	-	25%	**5%**	28%	30%	19%	16%	50%	**60%**
# Keystone taxa	10	12	14	19	2	0	5	6	4	0	6	**12**

Taxa richness and EPT abundance values from the upstream reference site indicate relatively stable conditions and a surprising number of intolerant (keystone) species. Many of these taxa were completely eliminated downstream of this location prior to construction and replaced by tolerant filter-feeding taxa, presumably responding to the input of fine particulate organic matter. Following construction, the number of taxa and EPT abundance values declined dramatically at site 2 (in bold). The Dominant in Common Index and the number of keystone species also declined at this site following restoration and this decline was also noted at site 3 near the lower end of the project. Interestingly the most dominant taxa at site 2 in 2002 following restoration were very tolerant chironomidae (Cricotopus bicinctus). The abundance of these taxa may be a response to the presence of coir-matting in this reach used for bank stabilization. Recovery from this initial impact to Jumping Run Creek appears to be occurring as taxa richness, EPT abundance have increased from data collected in 2002 and in 2003 and 2004 mimic, to some extent, pre-construction conditions. Interestingly conditions continued to improve at Site 3 below the restoration project, both the DIC and the number of keystone taxa increased at this location in 2004 (in bold). This may be a response to

the elimination of cattle and the efficiency of nutrient uptake of the new riparian zone at Site 2. This improvement was not noted within the restored reach where conditions were very similar to those in 2003.

Table 5 summarizes the number of animals collected from organic (leaf packs and sweeps) and inorganic (kicks and visuals) components of the collection. During this investigation, we noted that there was a great deal of organic material in the stream at site 2, primarily decomposing grasses that were planted near the stream to stabilize the new banks as well as coir-matting. However, this material didn't provide a productive habitat for organisms that would normally be found in the organic component of the collection. Note overall the decline in abundance values at this site compared to those found at the reference location and the numbers found in the organic fraction (in bold). The abundance values increased at site 3.

Table 3. 2003 EPT Abundance Table

Abundance values of Ephemeroptera, Plecoptera and Trichoptera collected from inorganic and organic components of samples during the 2003 investigation from Payne Dairy.

	Upstream Reference		**Site 2**		**Site 3**	
	inorganic	organic	inorganic	organic	inorganic	organic
Ephemeroptera	32	**60**	24	**25**	81	65
Plecoptera	20	**20**	0	**3**	8	10
Trichoptera	21	15	5	11	32	5
Subtotal	73	**95**	29	**39**	121	80
Total Abundance	168		68		201	

2.4 Areas of Concern

The following areas of concern for 2004 should be monitored closely and considered for repair as suggested:

- **Piping through the structure (Issue Photo 1)**
  - A cross vane just upstream of section 2 should be monitored for changes. It is presently partially piping through the structure.
- **Downcutting in Reach 4 (See Area 4 profile graph)**
  - Two areas of bed downcutting had occurred since construction (betweens stations 0+40 and 0+70 and 3+50 and 4+00). These areas should be watched closely in upcoming monitoring events.
- **Right bank migration on pool cross-section in area 4 (See Area 4 Cross-section)**
  - The bank has migrated over the past two monitoring periods. This area should be watched closely to ensure bank stability in upcoming monitoring events.
- **Toe scour at riffle cross-section in area 4 (See Area 4 Cross-section)**
  - Scour along the right bank toe should be watched closely to ensure bank stability in upcoming monitoring events.
- **Sediment laden water cutting through buffer in Area 4 (Issue Photo 3)**

- Concentrated sediment laden water cutting through the buffer. The path has formed into a small gully. The source of the water is the cow pasture adjacent to the project. The water is likely carrying significant amount of nutrients as well as sediment. This should be monitored to see if the problem continues. A level spreader may be necessary stop the short cutting of the buffer.
- Station: End of Area 4.

- **Vegetation**
  - Plantings are currently below minimum requirements (120 stems/acre planted and 270 stems/acre total including volunteer species). Supplemental planting should be considered.

The following areas of concern for 2003 and there current status:

- **Head cut area**
  - A previously noted headcut in Area 1 should be monitored in the future.

  Status: Headcut was not noticeable in the field or on the survey.

- **Piping through the structure (Issue Photo 2)**
  - A cross vane just upstream of section 2 should be monitored for changes. It is presently partially piping through the structure.

  Status: Structure was still piping but no further degradation was evident.

- **Cross vane wing slump**
  - `Cross vane below area 3 should be monitored for changes. Presently the arm has slumped

  Status: Vane arm remains in slumped condition but vegetation has established along the bank and not further degradation has occurred.

2.5 Jumping Run Photo Document

2000 – As built – Year 0 **2004 – Year 4**

Photo Point 1: Standing at riffle cross-section looking downstream (begin project)

Photo Point 2: Standing at riffle cross-section looking upstream (begin project)

Photo Point 3: Standing at pool cross-section looking upstream

2000 – As built – Year 0 **2003 – Year 3**

Photo Point 4: Standing at pool cross-section looking downstream

Photo Point 15: Standing at riffle cross-section looking downstream

Photo Point 16: Standing at riffle cross-section looking upstream

2000 – As built – Year 0 **2003 – Year 3**

Photo Point 19: Standing at pool cross-section looking upstream

Photo Point 20: Standing at pool cross-section looking downstream

Photo Point 39: Standing at riffle cross-section looking upstream

2000 – As built – Year 0

2003 – Year 3

Photo Point 40: Standing at riffle cross-section looking downstream near Henry Road

2002 – Year 2

Photo Point 41: Standing at pool cross-section looking upstream

2002 – Year 2

Photo Point 42: Standing at pool cross-section looking downstream

2000 – As built – Year 0 **2003 – Year 3**

Photo Point 46: Standing at pool cross-section looking upstream

Photo Point 47: Standing at pool cross-section looking downstream

Photo Point 48: Standing at riffle cross-section looking upstream

2000 – As built – Year 0 **2003 – Year 3**

Photo Point 49: Standing at riffle cross-section looking downstream

Photo Point 50: Looking upstream towards Paul Payne Store Road

Appendices

A. Methods
    1. Vegetation
    2. Morphology
B. Vegetation data
    1. Listed by plot
    2. Species, number and age
    3. Analysis of planted vs. natural recruitment
C. Morphology Data
    1. Cross-section data and plotted (DONE)
    2. Longitudinal data and plotted (DONE)
    3. Pebble count data and plotted (DONE)
    4. Pattern (DONE)

Project Name	Jumping Run Area 1
Cross Section	#1 (pins A-B)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

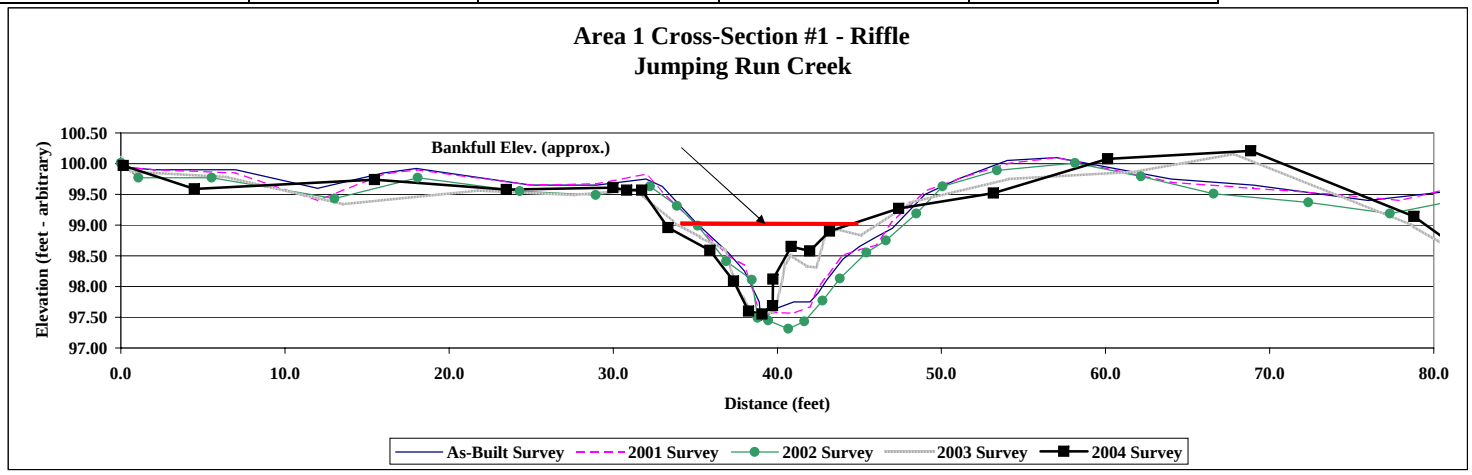
*2003 Elevation Adjusted +3.01

**2004 Elev. Adjusted up by 4.0 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation ***	**Notes**	**Station**	**Elev****	**Notes**
0.0	99.95	Grnd	0	99.95	Grnd	0.0	100.01	PIN-A	0.0	100.1	PIN-A	0.2	99.97	X1LP
2.0	99.90		2	99.9		1.1	99.77	G	0.6	99.87		4.5	99.59	X1
7.0	99.90		7	99.85		5.5	99.77	G	6.5	99.78		15.5	99.74	X1
12.0	99.60		12	99.4		13.0	99.43	G	13.5	99.34		23.5	99.58	X1
16.0	99.85		16	99.83		18.1	99.77	G	21.8	99.56		30.0	99.61	X1
18.0	99.92		18	99.9		24.3	99.55	G	27.7	99.49		30.8	99.57	X1B
25.0	99.65		25	99.65		28.9	99.49	G	31.4	99.58		31.7	99.57	X1
29.0	99.65		29	99.67		32.2	99.63	G	33.7	99.05	LBF (est)	33.3	98.96	X1
32.0	99.75		32	99.83		33.9	99.31	G	35.3	98.8		35.9	98.59	X1
33.0	99.63		33	99.55		35.1	98.99	LBF	36.8	98.6		37.3	98.09	X1
35.0	99.05	LBF (est)	35	99.03	LBF (est)	36.9	98.41	G	37.3	98.2		38.3	97.6	X1
37.0	98.55		37	98.5		38.5	98.11	LEOW	37.9	97.84		39.1	97.55	X1
38.0	98.25		38	98.35		38.8	97.49	CHN	38.7	97.47		39.7	97.69	X1
38.9	97.75		38.9	97.6		39.4	97.45	CHN	39.9	97.61		39.7	98.12	X1W
39.0	97.45		39	97.56		40.7	97.31	TW	40.2	98.03		40.9	98.65	X1
40.0	97.65		40	97.58		41.6	97.43	CHN	40.5	98.38		42.0	98.58	X1
41.0	97.75		41	97.57		42.8	97.77	CHN	40.9	98.51		43.2	98.9	X1
42.0	97.75		42	97.67		43.8	98.13	REOW	41.8	98.33		47.4	99.27	X1
42.5	97.90		42.5	98		45.4	98.55	G	42.4	98.31		53.2	99.52	X1
43.0	98.10		43	98.16		46.6	98.75	RBF	43.0	98.86		60.1	100.08	X1
44.0	98.45		44	98.51		48.5	99.19	G	43.7	98.93		68.9	100.21	X1
45.0	98.65		45	98.6	Est.	50.1	99.63	G	45.1	98.83		78.8	99.14	X1
46.0	98.80		46	98.67		53.4	99.89	G	48.0	99.36	RBF (est)	81.2	98.69	X1
47.0	98.95	RBF (est)	47	99.05	RBF (est)	58.1	100.01	G	54.1	99.75		86.1	98.3	X1
49.0	99.50		49	99.55		62.2	99.79	G	61.9	99.87		90.9	98.01	X1
51.0	99.75		51	99.75		66.6	99.51	G	67.9	100.16		96.2	98.25	X1
54.0	100.05		54	100		72.4	99.37	G	78.7	98.99		98.9	99.63	X1
57.0	100.10		57	100.1		77.3	99.19	G	82.1	98.45				
64.0	99.75		64	99.7		81.5	99.41	G	100.4	99.08	PIN-B1			
69.0	99.65		69	99.6		82.7	99.91	PIN-B						
76.0	99.40		74	99.5										
81.0	99.55		78	99.4										
82.3	99.85	Grnd	81	99.6										
82.3	99.93	Pin B?	82.3	99.85	Grnd									
	100.00		82.3	99.91	Pin B?									

Photo of Area 1 Cross-Section #1 - Looking Downstream

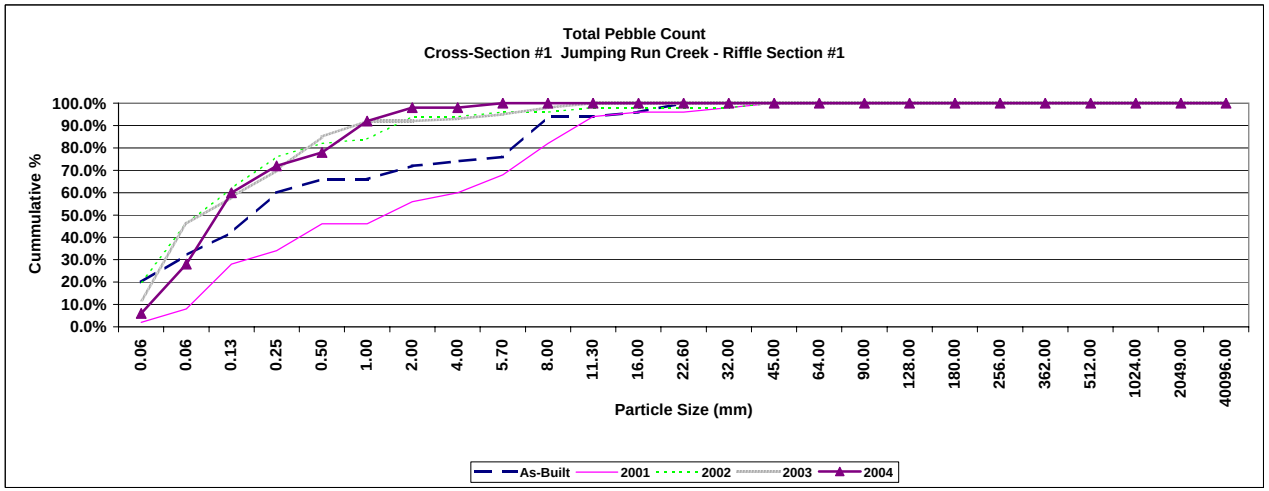
Bankfull Area					
	As-Built	**2001**	**2002**	**2003**	**2004**
Area	9.4	9.60	11.52	7.06	6.57
Width	14.0	12.0	13.3	11.8	9.8
Mean Depth	0.7	0.8	0.9	0.6	0.7
Max Depth	1.6	2.0	1.5	1.6	1.5
w/d ratio	20.8	15.0	15.4	19.9	14.5



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 1
Feature	Riffle
Date	10/7/03
Crew	Shaffer, Bidelspach, Clinton

			2000 As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bar**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bar**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	10	20.0%	20.0%	1	2.0%	2.0%	10	20.0%	20.0%	0	12	12.0%	12.0%	0.0%	0.0%	1	2	6.0%	6.0%
Sand	very fine sand	0.062	6	12.0%	32.0%	3	6.0%	8.0%	13	26.0%	46.0%	0	34	34.0%	46.0%	0.0%	0.0%	3	8	22.0%	28.0%
	fine sand	0.125	5	10.0%	42.0%	10	20.0%	28.0%	8	16.0%	62.0%	8	4	12.0%	58.0%	16.0%	16.0%	16		32.0%	60.0%
	medium sand	0.25	9	18.0%	60.0%	3	6.0%	34.0%	7	14.0%	76.0%	12		12.0%	70.0%	24.0%	40.0%	6		12.0%	72.0%
	course sand	0.50	3	6.0%	66.0%	6	12.0%	46.0%	3	6.0%	82.0%	15		15.0%	85.0%	30.0%	70.0%	3		6.0%	78.0%
	very course sand	1.0		0.0%	66.0%		0.0%	46.0%	1	2.0%	84.0%	7		7.0%	92.0%	14.0%	84.0%	7		14.0%	92.0%
Gravel	very fine gravel	2.0	3	6.0%	72.0%	5	10.0%	56.0%	5	10.0%	94.0%	0		0.0%	92.0%	0.0%	84.0%	3		6.0%	98.0%
	fine gravel	4.0	1	2.0%	74.0%	2	4.0%	60.0%		0.0%	94.0%	1		1.0%	93.0%	2.0%	86.0%	0		0.0%	98.0%
	fine gravel	5.7	1	2.0%	76.0%	4	8.0%	68.0%	1	2.0%	96.0%	2		2.0%	95.0%	4.0%	90.0%	1		2.0%	100.0%
	medium gravel	8.0	9	18.0%	94.0%	7	14.0%	82.0%		0.0%	96.0%	3		3.0%	98.0%	6.0%	96.0%			0.0%	100.0%
	medium gravel	11.3		0.0%	94.0%	6	12.0%	94.0%	1	2.0%	98.0%	2		2.0%	100.0%	4.0%	100.0%			0.0%	100.0%
	course gravel	16.0	1	2.0%	96.0%	1	2.0%	96.0%		0.0%	98.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	course gravel	22.6	2	4.0%	100.0%		0.0%	96.0%		0.0%	98.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	very course gravel	32		0.0%	100.0%	1	2.0%	98.0%		0.0%	98.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	very course gravel	45		0.0%	100.0%	1	2.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
Cobble	small cobble	64		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	medium cobble	90		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	large cobble	128		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
	very large boulder	2049		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	100.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		50	50	100.0%		100.0%		40	10	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.00	0.12	0.27	8.09	16.48
2001	0.13	0.41	2.10	10.32	10.32
2002	0.00	0.08	0.12	1.50	1.50
2003	0.07	0.08	0.12	0.73	6.85
2004	0.08	0.11	0.16	1.07	2.25



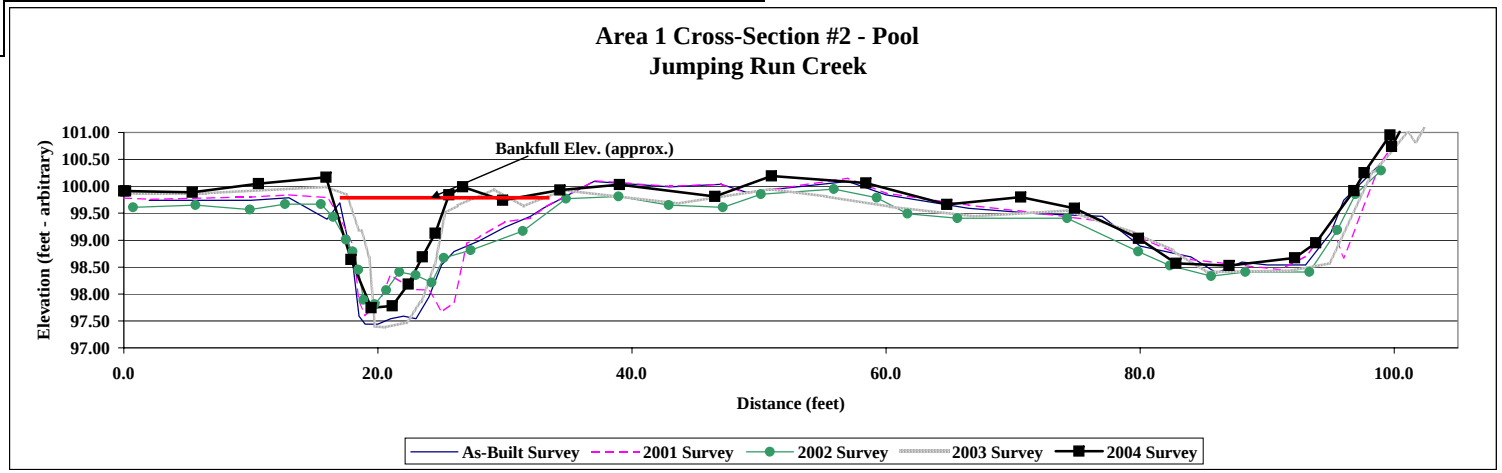
Project Name	Jumping Run Area 1
Cross Section	#2 (pins C-D)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

*2003 Stationing adjusted -28 ft
**2003 Elevations adjusted +5.73 ft
***2004 Elev adjusted +6.78 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station***	**Elevation****	**Notes**	**Station**	**Elev*****	**Notes**
0.0	100.00	PIN-C	0	99.78		0.0	99.87	PIN-C	-25.18	100.4		0	99.91	X2LP
2.0	99.74		2	99.76		0.7	99.61	G	-7.58	99.82		0.14	99.91	XSRP2
10.0	99.74		10	99.8		5.7	99.65	G	0.92	99.87		5.38	99.89	X2
13.0	99.79		13	99.84		9.9	99.57	G	6.38	99.87	Pin-C	10.61	100.05	X2
16.0	99.39		16	99.79		12.7	99.67	G	16	99.99		15.92	100.17	X2
17.0	99.69	LBF (est)	17	99.41	LBF (est)	15.5	99.67	G	17.52	99.84		17.89	98.64	X2W
18.0	98.59		18	98.94		16.5	99.43	LBF	18.5	99.19		19.46	97.74	X2W
18.5	97.59		18.5	97.85		17.5	99.01	G	18.72	99.17		21.14	97.78	X2
19.0	97.44		19	97.6		18.0	98.79	LEOW	19.33	98.68		22.38	98.18	X2
20.0	97.44		20	97.8		18.5	98.45	CHN	19.76	97.4		23.51	98.69	X2W
21.0	97.54		21	98.35		18.9	97.89	CHN	20.55	97.38		24.51	99.13	X2
22.0	97.59		22	98.2		19.8	97.81	CHN	22.22	97.47		25.58	99.84	X2
23.0	97.54		23	98.08		20.6	98.07	CHN	23.39	97.85		26.66	99.99	X2
24.0	97.94		24	98.07		21.7	98.41	CHN	24.45	98.52		29.83	99.74	X2
25.0	98.54		25	97.67		23.0	98.35	CHN	25.3	99.51		34.32	99.93	X2
26.0	98.79		26	97.84		24.2	98.21	CHN	26.27	99.64		39.02	100.03	X2
27.0	98.89		27	98.94		25.2	98.67	REOW	29.16	99.95		46.53	99.81	X2
28.0	98.99		28	99.06		27.3	98.81	G	31.47	99.63		50.97	100.19	X2
30.0	99.24		30	99.34		31.4	99.17	G	34.56	99.93		58.41	100.06	X2
32.0	99.44		32	99.41		34.8	99.77	RBF	43.65	99.68		64.78	99.66	X2
33.0	99.59	RBF (est)	33	99.59	RBF (est)	38.9	99.81	G	50.86	99.95		70.6	99.8	X2
37.0	100.09		37	100.1		42.9	99.65	G	55.29	99.81		74.82	99.59	X2
43.0	99.99		43	100		47.2	99.61	G	60.32	99.62		79.86	99.03	X2
47.0	100.04		47	100.04		50.2	99.85	G	66.91	99.44		82.81	98.57	X2
49.0	99.89		49	99.87		55.9	99.95	G	74.24	99.55		86.99	98.53	X2
57.0	100.09		57	100.15		59.3	99.79	G+VP	79.5	99.14		92.15	98.67	X2
60.0	99.84		60	99.87		61.7	99.49	G	82.59	98.81		93.81	98.95	X2
66.5	99.59		66.5	99.65		65.6	99.41	G	85.21	98.41		96.81	99.92	X2
72.0	99.49		72	99.5		74.2	99.41	G	91.91	98.43		97.62	100.25	X2
77.0	99.44		77	99.35		79.8	98.79	G	94.87	98.57		99.66	100.95	X2RP
80.0	98.89		84	98.64		82.3	98.53	G	98.32	100.27		99.79	100.74	X2
84.0	98.69		91	98.45		85.6	98.33	G	101.07	100.99	Pin-D	100.42	101.01	XSLP2
86.0	98.39		93	98.7		88.3	98.41	G	101.66	100.83				
88	98.59		95	99.31		93.3	98.41	G	104.6	102				
90	98.54		96	98.67		95.5	99.19	G	108.24	102.84				
93	98.54		99	100.48		96.9	99.85	G+VP	120.38	104.8				
95	99.14		100	100.78		98.9	100.29	G						
96	99.74		100	100.99	PIN-D?	100.1	100.99	PIN-D						
99	100.44													
100	100.69													
100	100.94	PIN-D												

Photo of Area 1 Cross-Section #2 - Looking Upstream

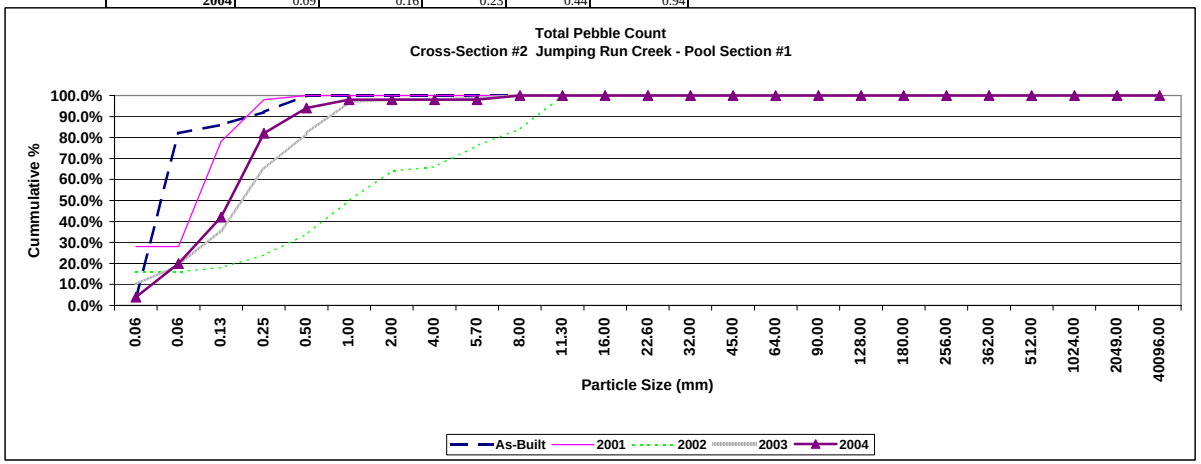
Bankfull Area	As-Built	2001	2002	2003	2004
Area	19.2	17.88	17.25	11.72	11.17
Width	16.0	16.0	19.3	8.8	9.7
Mean Depth	1.2	1.1	0.9	1.3	1.2
Max Depth	2.3	2.1	1.9	2.3	2.0



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 1
Feature	Pool
Date	10/7/03
Crew	Shaffer, Bidelspach, Clinton

		2000	As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Pool**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	2	4.0%	4.0%	14	28.0%	28.0%	8	16.0%	16.0%	4	6	10.0%	10.0%	8.0%	8.0%	2	0	4.0%	4.0%
Sand	very fine sand	0.062	39	78.0%	82.0%	0	0.0%	28.0%	0	0.0%	16.0%	6	3	9.0%	19.0%	12.0%	20.0%	8	0	16.0%	20.0%
	fine sand	0.125	2	4.0%	86.0%	25	50.0%	78.0%	1	2.0%	18.0%	8	9	17.0%	36.0%	16.0%	36.0%	10	1	22.0%	42.0%
	medium sand	0.25	3	6.0%	92.0%	10	20.0%	98.0%	3	6.0%	24.0%	15	14	29.0%	65.0%	30.0%	66.0%	12	8	40.0%	82.0%
	course sand	0.50	4	8.0%	100.0%	1	2.0%	100.0%	5	10.0%	34.0%	9	8	17.0%	82.0%	18.0%	84.0%	5	1	12.0%	94.0%
	very course sand	1.0	0	0.0%	100.0%	0	0.0%	100.0%	8	16.0%	50.0%	15		15.0%	97.0%	30.0%	114.0%	2		4.0%	98.0%
G r a v e l	very fine gravel	2.0	0	0.0%	100.0%	0	0.0%	100.0%	7	14.0%	64.0%	1		1.0%	98.0%	2.0%	116.0%	0		0.0%	98.0%
	fine gravel	4.0	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	66.0%	0		0.0%	98.0%	0.0%	116.0%	0		0.0%	98.0%
	fine gravel	5.7	0	0.0%	100.0%	0	0.0%	100.0%	5	10.0%	76.0%	1		1.0%	99.0%	2.0%	118.0%	0		0.0%	98.0%
	medium gravel	8.0	0	0.0%	100.0%	0	0.0%	100.0%	4	8.0%	84.0%	1		1.0%	100.0%	2.0%	120.0%	1		2.0%	100.0%
	medium gravel	11.3	0	0.0%	100.0%	0	0.0%	100.0%	8	16.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	course gravel	16.0	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	course gravel	22.6	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very course gravel	32	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very course gravel	45	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		60	40	100.0%		120.0%		40	10	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.07	0.07	0.08	0.14	0.52
2001	0.00	0.11	0.13	0.24	0.24
2002	0.16	0.80	1.50	9.65	9.65
2003	0.08	0.18	0.28	0.85	1.40
2004	0.09	0.16	0.23	0.44	0.94



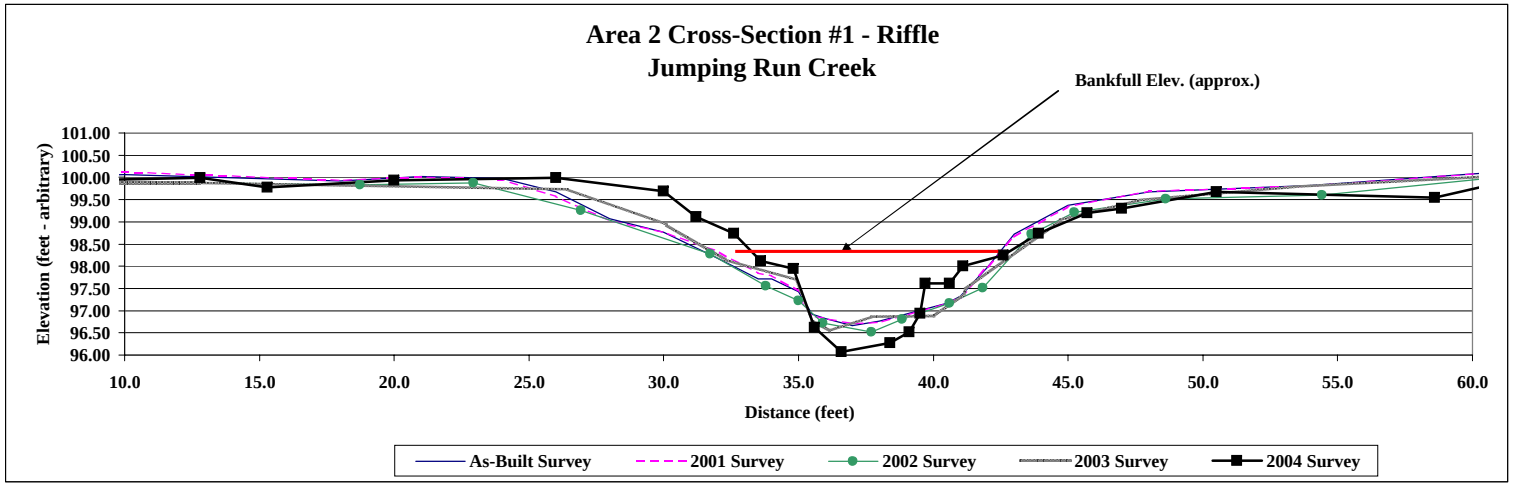
Project Name	Jumping Run Area 2
Cross Section	#1 (pins E-F)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

*2003 Elev adjusted +30.25 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elev***	**Notes**	**Station**	**Elev**	**Notes**
0.0	100.32	PIN-E?	0	99.8		0.0	99.96	PIN-E	0	99.84	Pin-E	1	99.84	XSLP
0.0	99.77		5	100.03		1.4	99.78	G	2.08	99.79		1	99.64	XS
5.0	99.97		10	100.12		9.2	99.9	G	6.12	99.88		5	99.89	XS
10.0	100.07		18	99.94		18.7	99.84	G	12.75	99.87		12.8	99.99	XS1
18.0	99.92		21	100.01		22.9	99.88	G	26.43	99.73		15.3	99.77	XS
21.0	100.02		24	99.95		26.9	99.26	G	30.11	98.94		20	99.94	XS1
24.0	99.97		26	99.58		31.7	98.28	LBF	32.3	98.15	LBF (est)	26	99.99	XS1W
26.0	99.67		28	99.03		33.8	97.56	G	34.87	97.7		30	99.69	XS1
28.0	99.07		30	98.77		35.0	97.22	LEOW	35.5	96.79		31.2	99.11	XS1
30.0	98.77		32	98.33		35.9	96.72	CHN	36.17	96.55		32.6	98.74	XS1
32.0	98.17	LBF (est)	33.5	97.84	LBF (est)	37.7	96.52	TW	37.72	96.86		33.6	98.12	BKF
33.5	97.72		34	97.78		38.8	96.8	CHN	40.03	96.88		34.8	97.95	XS1
34.0	97.72		35	97.46		40.6	97.16	REOW	41.16	97.39		35.6	96.62	XS1
35.0	97.42		35.2	97.11		41.8	97.52	RBF	41.2	97.49	RBF (est)	36.6	96.07	XS1W
35.5	96.92		35.5	96.88		43.6	98.72	G	44.7	99.04		38.4	96.27	XS1
36.0	96.82		36	96.82		45.2	99.22	G	47.64	99.48		39.1	96.52	XS1
37.0	96.67		37	96.71		48.6	99.52	G	53.39	99.79		39.5	96.94	XS1
38.0	96.77		38	96.73		54.4	99.6	G	60.2	100		39.7	97.61	XS1
39.0	96.92		39	96.9		61.1	100	G	65.16	100.17	Pin-F	40.6	97.61	XS1
40.5	97.17		40.5	97.16		64.4	100.06	G				41.1	98	BKF
41.0	97.32	RBF (est)	41	97.29		65.3	100.32	PIN-F				42.6	98.25	XS1
42.0	97.97		42	97.99	RBF (est)							43.9	98.74	XS1
43.0	98.72		43	98.66								45.7	99.2	XS1
45.0	99.37		45	99.35								47.0	99.3	XS1
48.0	99.67		48	99.69								50.5	99.68	XS1
54.0	99.82		54	99.8								58.6	99.55	XS
61.0	100.12		61	100.12								61.0	99.87	XS1
63.0	100.12		63	100.15								66.6	100.04	XS1
63.0	100.32	Pin--F?	63	100.32								66.7	100.14	XS1RP

Photo of Area 2 Cross-Section #1 - Looking Downstream

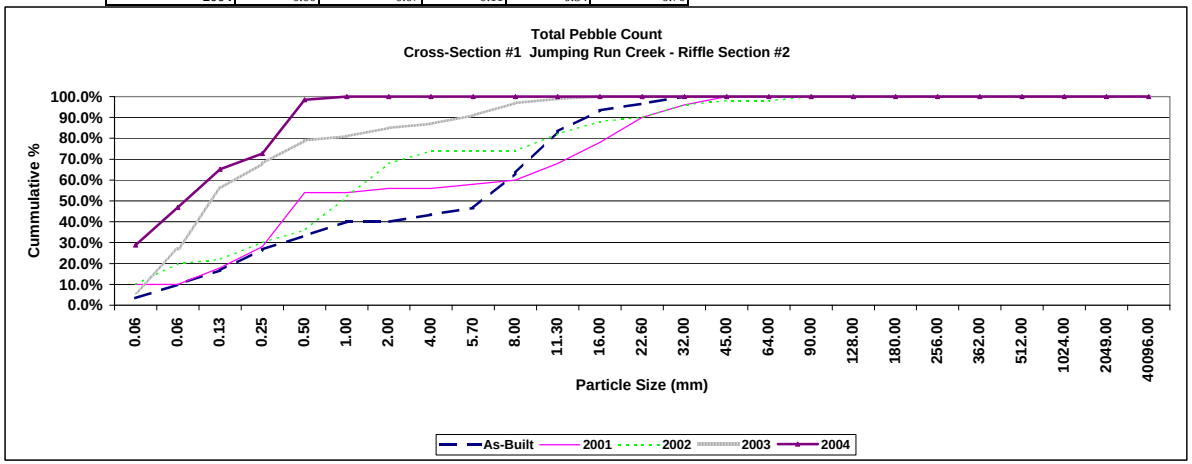
Bankfull Area					
	As-Built	**2001**	**2002**	**2003**	**2004**
Area	9.0	8.30	10.17	10.76	7.76
Width	11.5	9.5	11.9	12.8	7.8
Mean Depth	0.8	0.9	0.9	0.8	1.00
Max Depth	1.4	1.4	1.6	1.6	2.0
w/d Ratio	14.7	10.9	13.9	15.2	7.8



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 2
Feature	Riffle
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

		2000	As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	1	3.3%	3.3%	5	10.0%	10.0%	5	10.0%	10.0%	0	6	6.0%	6.0%	0.0%	0.0%	8	11	28.8%	28.8%
Sand	very fine sand	0.062	2	6.7%	10.0%		0.0%	10.0%	5	10.0%	20.0%	0	21	21.0%	27.0%	0.0%	0.0%	3	9	18.2%	47.0%
	fine sand	0.125	2	6.7%	16.7%	4	8.0%	18.0%	1	2.0%	22.0%	16	13	29.0%	56.0%	32.0%	32.0%	3	9	18.2%	65.2%
	medium sand	0.25	3	10.0%	26.7%	5	10.0%	28.0%	4	8.0%	30.0%	12		12.0%	68.0%	24.0%	56.0%	1	4	7.6%	72.7%
	course sand	0.50	2	6.7%	33.3%	13	26.0%	54.0%	3	6.0%	36.0%	11		11.0%	79.0%	22.0%	78.0%	8	9	25.8%	98.5%
	very course sand	1.0	2	6.7%	40.0%		0.0%	54.0%	8	16.0%	52.0%	2		2.0%	81.0%	4.0%	82.0%	1		1.5%	100.0%
G r a v e l	very fine gravel	2.0		0.0%	40.0%	1	2.0%	56.0%	8	16.0%	68.0%	4		4.0%	85.0%	8.0%	90.0%	0		0.0%	100.0%
	fine gravel	4.0	1	3.3%	43.3%		0.0%	56.0%	3	6.0%	74.0%	2		2.0%	87.0%	4.0%	94.0%	0		0.0%	100.0%
	fine gravel	5.7	1	3.3%	46.7%	1	2.0%	58.0%		0.0%	74.0%	4		4.0%	91.0%	8.0%	102.0%	0		0.0%	100.0%
	medium gravel	8.0	5	16.7%	63.3%	1	2.0%	60.0%		0.0%	74.0%	6		6.0%	97.0%	12.0%	114.0%	0		0.0%	100.0%
	medium gravel	11.3	6	20.0%	83.3%	4	8.0%	68.0%	4	8.0%	82.0%	2		2.0%	99.0%	4.0%	118.0%	0		0.0%	100.0%
	course gravel	16.0	3	10.0%	93.3%	5	10.0%	78.0%	3	6.0%	88.0%	1		1.0%	100.0%	2.0%	120.0%	0		0.0%	100.0%
	course gravel	22.6	1	3.3%	96.7%	6	12.0%	90.0%	1	2.0%	90.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very course gravel	32	1	3.3%	100.0%	3	6.0%	96.0%	3	6.0%	96.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very course gravel	45		0.0%	100.0%	2	4.0%	100.0%	1	2.0%	98.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Cobble	small cobble	64		0.0%	100.0%		0.0%	100.0%		0.0%	98.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium cobble	90		0.0%	100.0%		0.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large cobble	128		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large boulder	2049		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
TOTAL / %of whole count			30	100.0%		50	100.0%		50	100.0%		60	40	100.0%		120.0%		24	42	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.18	0.94	7.41	14.03	23.30
2001	0.16	0.48	0.69	23.30	23.30
2002	0.08	0.69	1.41	15.53	15.53
2003	0.08	0.12	0.17	2.63	8.72
2004	0.00	0.07	0.11	0.54	0.70



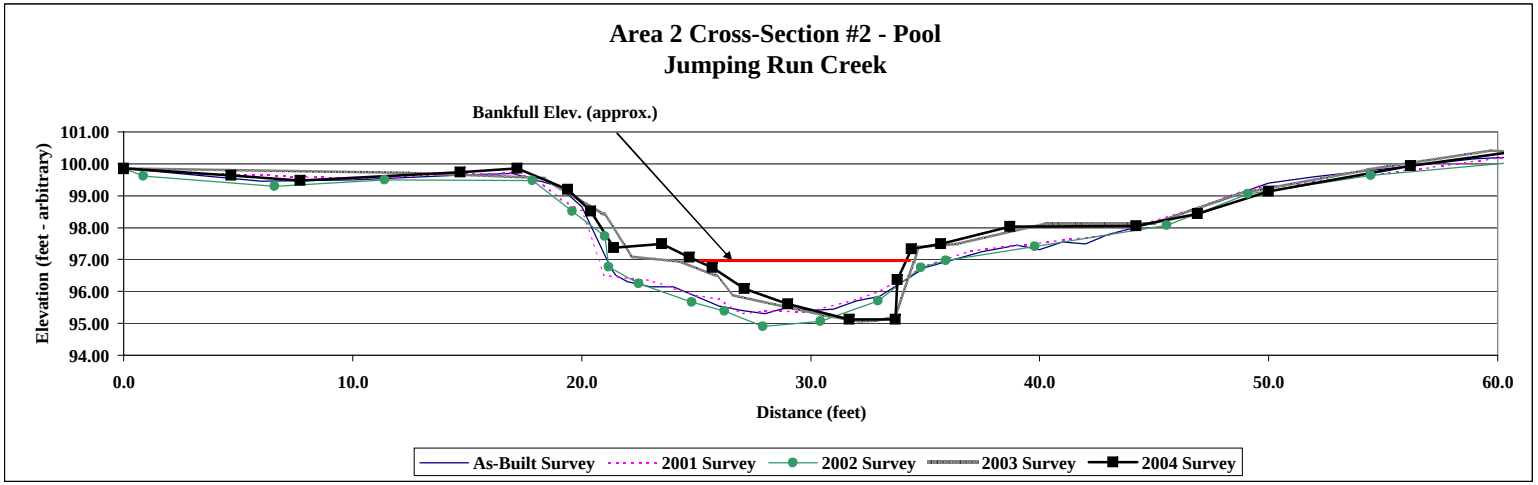
Project Name	Jumping Run Area 2
Cross Section	#2 (pins G-H)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

*2003 Elevations adjusted +9.85 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elev***	**Notes**	**Station**	**Elev**	**Notes**
0.0	99.85		0	99.87		0.0	99.85	PIN-G	0	99.86	Pin G	64.7	100.2	
6.0	99.45		2	99.73		0.9	99.62	G	12.4	99.71		60.7	100.38	
10.0	99.50		10	99.53		6.6	99.3	G	18.4	99.55		56.2	99.94	
15.0	99.65		13	99.64		11.4	99.5	G	21.0	98.41		50.0	99.14	
17.0	99.70		16	99.7		17.9	99.48	G	22.2	97.08		46.9	98.44	
19.0	99.30		17	99.71		19.6	98.52	G	24.4	96.92	LBF (est)	44.2	98.05	
20.0	98.65		18	99.55		21.0	97.74	G	25.8	96.48		38.7	98.03	
21.3	96.70	LBF (est)	19	98.94		21.2	96.76	LBF	26.6	95.89		35.7	97.49	
21.5	96.50		20	98.53		22.5	96.24	CHN	30.5	95.27		34.4	97.32	BKF
22.0	96.30		21	96.51	LBF (est)	24.8	95.66	CHN	32.1	95.07		33.8	96.37	
23.0	96.15		22	96.4		26.2	95.38	CHN	32.9	95.08		33.7	95.13	
24.0	96.15		23	96.34		27.9	94.9	TW	33.7	95.21		31.7	95.12	
26.0	95.55		24	96.1		30.4	95.06	TW	34.5	96.9	RBF (est)	29.0	95.61	
27.0	95.40		25	95.87		32.9	95.7	CHN	34.7	97.38		27.1	96.09	
28.0	95.30		26	95.77		34.8	96.74	RBF	36.4	97.48		25.7	96.74	BKF
29.0	95.50		27	95.3		35.9	96.96	G	40.3	98.14		24.7	97.06	
30.0	95.40		28	95.39		39.8	97.4	G	45.0	98.13		23.5	97.48	
31.0	95.45		30	95.37		45.6	98.08	G	48.7	99.05		21.4	97.37	
32.0	95.70		32	95.75		49.1	99.06	G	54.3	99.81		20.4	98.52	
33.0	95.85		33	96.01		54.5	99.64	G	59.7	100.41	Pin H	19.4	99.2	
35.0	96.75	RBF (est)	35	96.78	RBF (est)	60.9	100.06	G	64.4	100.2		17.2	99.86	
37.5	97.25		37	97.27		69.3	99.92	G				14.7	99.74	
39.0	97.45		43	97.78		70.4	100.54	PIN-H				7.7	99.48	
40.0	97.30		47	98.65								4.7	99.64	
41.0	97.55		49	99.18								0	99.85	
42.0	97.50		57	99.88								0	99.84	
43.0	97.80		60	100.18										
45.0	98.15		66	100.17										
50.0	99.40		70	100.27										
52.0	99.60		70	100.5	Pin H?									
59.0	100.15													
62.0	100.25													
67.0	100.15													
70.5	100.25													
70.5	100.51	Pin H?												

Photo of Area 2 Cross-Section #2 - Looking Upstream

Bankfull Area					
	As-Built	**2001**	**2002**	**2003**	**2004**
Area	12.8	12.22	15.53	10.85	7.20
Width	13.7	14.0	13.6	12.3	8.7
Mean Depth	0.9	0.9	1.1	0.9	0.8
Max Depth	1.5	1.5	1.8	1.7	1.6

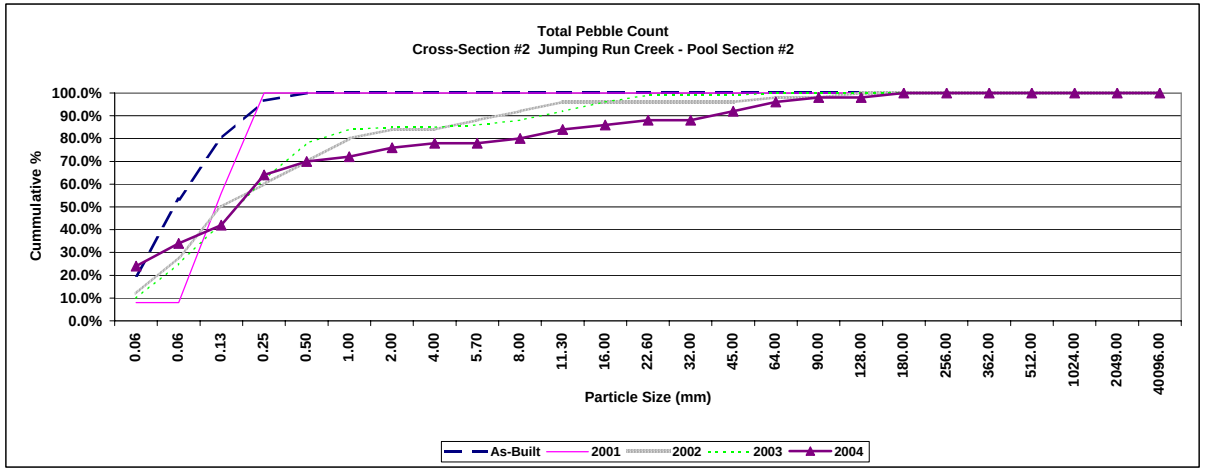


Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 2
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

Cross Section #1

			2000 As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	6	20.0%	20.0%	4	8.0%	8.0%	6	12.0%	12.0%	0	10	10.0%	10.0%	0.0%	0.0%	0	12	24.0%	24.0%
Sand	very fine sand	0.062	10	33.3%	53.3%	0	0.0%	8.0%	8	16.0%	28.0%	3	12	15.0%	25.0%	6.0%	6.0%	0	5	10.0%	34.0%
	fine sand	0.125	8	26.7%	80.0%	24	48.0%	56.0%	11	22.0%	50.0%	10	8	18.0%	43.0%	20.0%	26.0%	0	4	8.0%	42.0%
	medium sand	0.25	5	16.7%	96.7%	22	44.0%	100.0%	5	10.0%	60.0%	19	0	19.0%	62.0%	38.0%	64.0%	1	10	22.0%	64.0%
	course sand	0.50	1	3.3%	100.0%	0	0.0%	100.0%	5	10.0%	70.0%	16	0	16.0%	78.0%	32.0%	96.0%	1	2	6.0%	70.0%
	very course sand	1.0	0	0.0%	100.0%	0	0.0%	100.0%	5	10.0%	80.0%	6	0	6.0%	84.0%	12.0%	108.0%	1	0	2.0%	72.0%
G r a v e l	very fine gravel	2.0	0	0.0%	100.0%	0	0.0%	100.0%	2	4.0%	84.0%	1	0	1.0%	85.0%	2.0%	110.0%	2	0	4.0%	76.0%
	fine gravel	4.0	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	84.0%	0	0	0.0%	85.0%	0.0%	110.0%	1	0	2.0%	78.0%
	fine gravel	5.7	0	0.0%	100.0%	0	0.0%	100.0%	2	4.0%	88.0%	1	0	1.0%	86.0%	2.0%	112.0%	0	0	0.0%	78.0%
	medium gravel	8.0	0	0.0%	100.0%	0	0.0%	100.0%	2	4.0%	92.0%	2		2.0%	88.0%	4.0%	116.0%	1		2.0%	80.0%
	medium gravel	11.3	0	0.0%	100.0%	0	0.0%	100.0%	2	4.0%	96.0%	4		4.0%	92.0%	8.0%	124.0%	2		4.0%	84.0%
	course gravel	16.0	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	96.0%	4		4.0%	96.0%	8.0%	132.0%	1		2.0%	86.0%
	course gravel	22.6	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	96.0%	3		3.0%	99.0%	6.0%	138.0%	1		2.0%	88.0%
	very course gravel	32	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	96.0%			0.0%	99.0%	0.0%	138.0%	0		0.0%	88.0%
	very course gravel	45	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	96.0%			0.0%	99.0%	0.0%	138.0%	2		4.0%	92.0%
Cobble	small cobble	64	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	98.0%	1		1.0%	100.0%	2.0%	140.0%	2		4.0%	96.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	98.0%			0.0%	100.0%	0.0%	140.0%	1		2.0%	98.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%	0.0%	140.0%	0		0.0%	98.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%	1		2.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
TOTAL / %of whole count			30	100.0%		50	100.0%		50	100.0%		70	30	100.0%		140.0%		17	33	100.0%	

	d16	d35	d50	d84	d95
As-Built	0.00	0.08	0.09	0.23	0.36
2001	0.11	0.15	0.18	0.31	0.31
2002	0.07	0.12	0.19	7.85	7.85
2003	0.07	0.15	0.26	1.50	17.89
2004	0.00	0.11	0.26	13.65	71.37



Project Name	Jumping Run Area 3
Cross Section	#1 (pins I-J)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

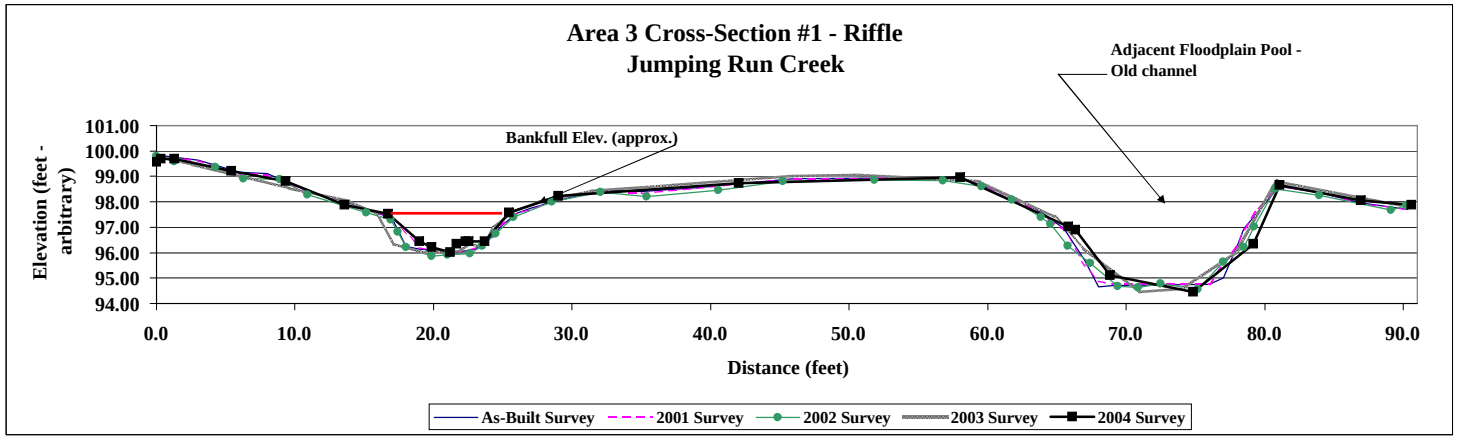
*2003 Survey Elev Adjusted +21.09 ft

**2004 Survey Elev Adjusted +23.7 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elev***	**Notes**	**Station**	**Elev****	**Notes**
0.0	99.85		0.0	99.82		0.0	99.79	PIN-I	0.0	99.79	Pin - I	0.0	99.57	(X1)
3.0	99.65		2.0	99.7		1.3	99.59	G	2.7	99.46		0.3	99.69	(X1LP)
6.0	99.15		3.0	99.61		4.2	99.37	G	9.6	98.53		1.3	99.7	(X1LP)
8.0	99.10		6.0	99.11		6.3	98.91	G	13.9	98.03		5.4	99.2	(X1)
11.0	98.40		8.0	99.07		8.9	98.89	G	15.8	97.54	LBF (est)	9.3	98.82	(X1)
13.0	98.10		11.0	98.41		10.9	98.27	G	17.1	96.34		13.6	97.89	(X1)
15.0	97.75		13.0	98.11		15.2	97.57	G	19.4	96		16.7	97.53	BKF
16.0	97.55		15.0	97.72		16.9	97.29	LBF	20.9	96.09		19.0	96.43	(X1)
17.0	97.35	LBF (est)	16.0	97.59		17.4	96.81	G	21.9	96.05		19.9	96.21	(X1W)
18.0	96.25		17.0	97.35	LBF (est)	18.0	96.21	LEOW	22.6	96.36		21.2	96.02	(X1T)
19.0	96.15		18.0	96.78		19.9	95.87	CHN	23.6	96.18		21.7	96.35	(X1W)
20.0	96.10		19.0	96.2		21.0	95.91	TW	23.8	96.49		22.3	96.43	(X1W)
21.0	96.05		20.0	96.08		22.6	95.97	CHN	24.4	96.96		22.5	96.43	(X1)
22.0	96.05		21.0	95.88		23.5	96.27	REOW	25.5	97.54	RBF (est)	23.7	96.44	(X1)
23.0	96.15		22.0	96.04		24.5	96.75	G	27.7	98.01		25.5	97.57	BKF
24.0	96.55		23.0	96.16		25.8	97.41	RBF	31.5	98.42		29.0	98.23	(X1)
25.0	97.10		24.0	96.49		28.5	98.01	G	37.3	98.65		42.1	98.74	(X1)
26.0	97.55	RBF (est)	25.0	97.12		32.1	98.39	G	45.7	99.01		58.0	98.95	(X1)
27.0	97.75		26.0	97.55	RBF (est)	35.4	98.21	G	50.7	99.05		65.8	97.01	(X1)
29.0	98.05		27.0	97.68		40.5	98.45	G	59.4	98.82		66.3	96.9	(X1)
32.0	98.45		29.0	98.12		45.2	98.81	G	64.8	97.4		68.9	95.11	(X1)
35.0	98.40		32.0	98.43		51.8	98.85	G	66.9	96.19		74.8	94.46	(X1)
39.0	98.55		35.0	98.34		56.8	98.83	G	71.0	94.45		79.2	96.35	(X1)
46.0	98.90		39.0	98.53		59.5	98.61	G	74.1	94.57		81.1	98.65	(X1)
58.0	98.95		46.0	98.91		61.8	98.07	G	77.8	96		86.9	98.05	(X1)
62.0	98.15		58.0	98.93		63.8	97.39	G	80.9	98.8		90.6	97.87	(X1RP)
64.0	97.55		62.0	98.13		64.5	97.13	G+VP	89.8	97.84	Pin - J			
65.5	96.95		64.0	97.51		65.8	96.27	G						
67.0	95.70		65.5	96.92		67.4	95.59	G						
68.0	94.65		67.0	95.48		69.4	94.67	G						
69.0	94.70		68.0	94.88		70.9	94.63	G						
76.0	94.75		69.0	94.76		72.5	94.77	G						
77.0	95.00		76.0	94.76		75.2	94.55	G						
78	96.30		77.0	95.55		77.0	95.63	G						
78.5	96.95		78.0	96.27		78.5	96.21	G						
79.5	97.6		78.5	96.92		79.2	97.03	G+VP						
81	98.6		79.5	97.75		80.7	98.51	G						
84	98.35		81.0	98.62		83.9	98.25	G						
87	97.95		84.0	98.38		89.1	97.67	G						
90.3	97.7		87.0	97.93		90.2	97.85	PIN-J						
90.3	97.85	Pin J?	90.3	97.71										
			90.3	97.83	Pin J?									

Photo of Area 3 Cross-Section #1 - Looking Upstream

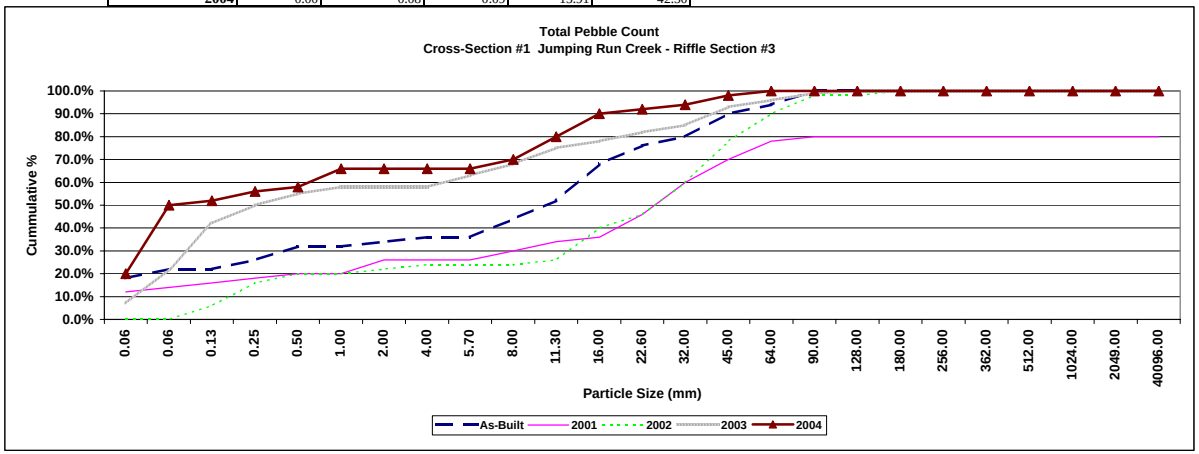
Bankfull Area					
	As-Built	**2002**	**2003**	**2003**	**2004**
Area	8.3	7.95	9.35	8.99	6.83
Width	9.0	9.0	10.6	9.7	8.7
Mean Depth	0.9	0.9	0.9	0.9	0.8
Max Depth	1.3	1.5	1.5	1.3	1.3
w/d ratio	9.8	10.2	12.0	10.4	11.2



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 3
Feature	Riffle
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

			2000 As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	9	18.0%	18.0%	6	12.0%	12.0%		0.0%	0.0%	2	5	7.0%	7.0%	4.0%	4.0%	1	9	20.0%	20.0%
Sand	very fine sand	0.062	2	4.0%	22.0%	1	2.0%	14.0%		0.0%	0.0%	1	14	15.0%	22.0%	2.0%	6.0%	5	10	30.0%	50.0%
	fine sand	0.125		0.0%	22.0%	1	2.0%	16.0%	3	6.0%	6.0%	10	10	20.0%	42.0%	20.0%	26.0%	1	0	2.0%	52.0%
	medium sand	0.25	2	4.0%	26.0%	1	2.0%	18.0%	5	10.0%	16.0%	8		8.0%	50.0%	16.0%	42.0%	2	0	4.0%	56.0%
	course sand	0.50	3	6.0%	32.0%	1	2.0%	20.0%	2	4.0%	20.0%	5		5.0%	55.0%	10.0%	52.0%	1	0	2.0%	58.0%
	very course sand	1.0		0.0%	32.0%		0.0%	20.0%		0.0%	20.0%	3		3.0%	58.0%	6.0%	58.0%	4	0	8.0%	66.0%
Gravel	very fine gravel	2.0	1	2.0%	34.0%	3	6.0%	26.0%	1	2.0%	22.0%	0		0.0%	58.0%	0.0%	58.0%	0	0	0.0%	66.0%
	fine gravel	4.0	1	2.0%	36.0%		0.0%	26.0%	1	2.0%	24.0%	0		0.0%	58.0%	0.0%	58.0%	0	0	0.0%	66.0%
	fine gravel	5.7		0.0%	36.0%		0.0%	26.0%		0.0%	24.0%	5		5.0%	63.0%	10.0%	68.0%	0	0	0.0%	66.0%
	medium gravel	8.0	4	8.0%	44.0%	2	4.0%	30.0%		0.0%	24.0%	5		5.0%	68.0%	10.0%	78.0%	2	0	4.0%	70.0%
	medium gravel	11.3	4	8.0%	52.0%	2	4.0%	34.0%	1	2.0%	26.0%	7		7.0%	75.0%	14.0%	92.0%	4	1	10.0%	80.0%
	course gravel	16.0	8	16.0%	68.0%	1	2.0%	36.0%	7	14.0%	40.0%	3		3.0%	78.0%	6.0%	98.0%	5		10.0%	90.0%
	course gravel	22.6	4	8.0%	76.0%	5	10.0%	46.0%	3	6.0%	46.0%	4		4.0%	82.0%	8.0%	106.0%	1		2.0%	92.0%
	very course gravel	32	2	4.0%	80.0%	7	14.0%	60.0%	7	14.0%	60.0%	3		3.0%	85.0%	6.0%	112.0%	1		2.0%	94.0%
	very course gravel	45	5	10.0%	90.0%	5	10.0%	70.0%	9	18.0%	78.0%	8		8.0%	93.0%	16.0%	128.0%	2		4.0%	98.0%
Cobble	small cobble	64	2	4.0%	94.0%	4	8.0%	78.0%	6	12.0%	90.0%	3		3.0%	96.0%	6.0%	134.0%	1		2.0%	100.0%
	medium cobble	90	3	6.0%	100.0%	1	2.0%	80.0%	4	8.0%	98.0%	2	1	3.0%	99.0%	4.0%	138.0%			0.0%	100.0%
	large cobble	128		0.0%	100.0%		0.0%	80.0%		0.0%	98.0%	1		1.0%	100.0%	2.0%	140.0%			0.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	80.0%	1	2.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
	very large boulder	2049		0.0%	100.0%		0.0%	80.0%		0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	80.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	140.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		40	80.0%		50	100.0%		70	30	100.0%		140.0%		30	20	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.00	3.93	12.65	44.90	82.33
2001	0.19	16.48	30.50	0.00	0.00
2002	0.38	17.28	30.50	65.75	65.75
2003	0.08	0.15	0.38	34.77	69.50
2004	0.00	0.08	0.09	15.91	42.50



Project Name	Jumping Run Area 3
Cross Section	#2 (pins K-L)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

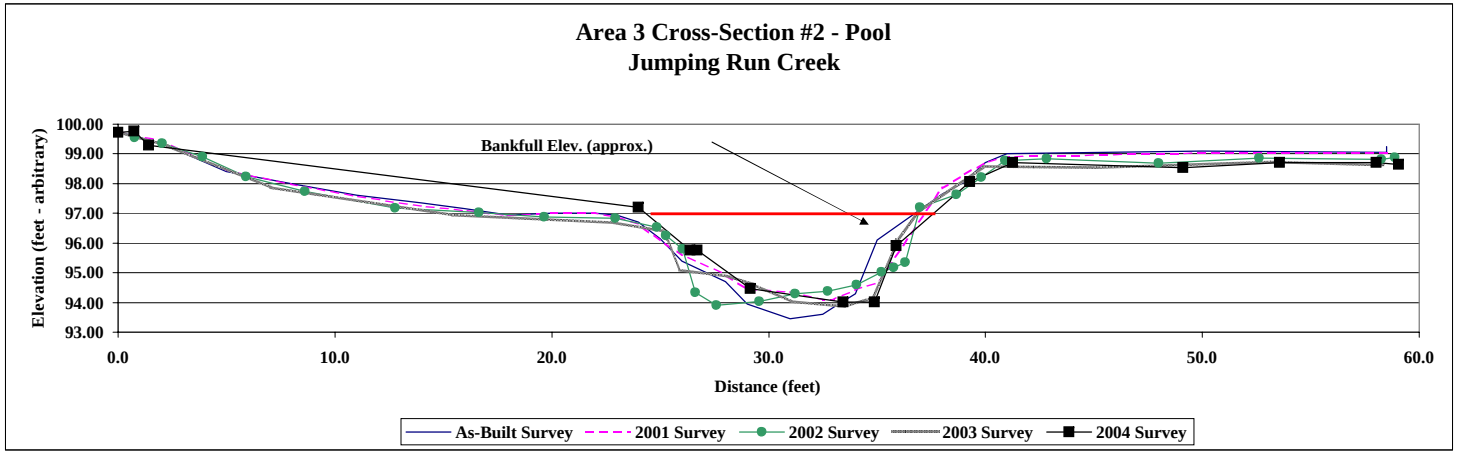
*2003 Survey Elev Adjusted +21.88 ft

**2004 Survey Elev Adjusted +24.6 ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elev***	**Notes**	**Station**	**Elev****	**Notes**
0.0	99.75		0.0	99.75		0	Bad shot	Pin-K	0	99.75	Pin - K	0	99.73	(X2LP)
2.0	99.35		2.0	99.44		0.77	99.55	G	2.29	99.26		0.73	99.77	(X2LP)
5.0	98.40		5.0	98.46		2.03	99.35	G	7.06	97.87		1.42	99.29	(X2)
8.0	98.00		8.0	97.97		3.90	98.91	G	15.45	96.94	LBF(est)	24.00	97.21	(X2)
11.0	97.60		11.0	97.56		5.89	98.23	G	22.90	96.68		26.37	95.75	(X2W)
14.0	97.35		14.0	97.25		8.61	97.73	G	25.11	96.41		26.70	95.76	(X2)
16.0	97.15		16.0	97.09		12.78	97.17	G	25.31	96.10		29.17	94.46	(X2)
18.0	96.95		18.0	96.92		16.65	97.03	LBKF	25.91	95.08		33.44	94.01	(X2T)
20.0	97.00		20.0	97.01		19.66	96.87	G	28.19	94.87		34.89	94.01	(X2)
22.0	97.00	LBF (est)	22.0	97.01	LBF (est)	22.94	96.83	G	29.27	94.61		35.90	95.90	(X2W)
23.0	96.95		23.0	96.87		24.86	96.53	G	31.05	94.03		39.29	98.07	(X2)
24.0	96.70		24.0	96.63		25.27	96.25	LEOW	33.54	93.87		41.25	98.70	(X2)
25.0	96.15		25.0	96.11		26.03	95.79	CHN	34.79	94.17		49.10	98.54	(X2)
26.0	95.40		26.0	95.61		26.61	94.33	CHN	35.80	95.76		53.58	98.70	(X2)
28.0	94.70		28.0	94.94		27.59	93.91	CHN	35.90	96.10		58.03	98.70	(X2RP)
29.0	93.95		29.0	94.45		29.58	94.03	CHN	36.97	97.06	RBF(est)	59.06	98.64	(X2RP)
31.0	93.45		31.0	94.35		31.23	94.29	CHN	39.90	98.58				
32.5	93.60		32.5	94.1		32.73	94.37	CHN	45.10	98.54				
33.0	93.85		33.0	94.1		34.05	94.59	CHN	53.11	98.72				
34.0	94.30		34.0	94.43		35.20	95.03	CHN	58.34	98.62	Pin - L			
35.0	96.10		35.0	94.65		35.77	95.17	CHN						
38.0	97.65	RBF (est)	38.0	97.85	RBF (est)	36.31	95.35	CHN						
39.0	98.05		39.0	98.29		36.98	97.21	RBF						
40.0	98.70		40.0	98.71		38.65	97.63	G						
41.0	99.00		41.0	98.91		39.81	98.21	G						
50.0	99.10		50.0	99.03		40.91	98.77	G						
58.5	99.05		58.5	99.04		42.81	98.83	G						
58.5	99.25	Pin L?	58.5	99.21	Pin L?	47.99	98.69	G						
						52.62	98.85	G						
						58.27	98.81	G						
						58.87	98.87	Pin L						

Photo of Area 3 Cross-Section #2 - Looking Downstream

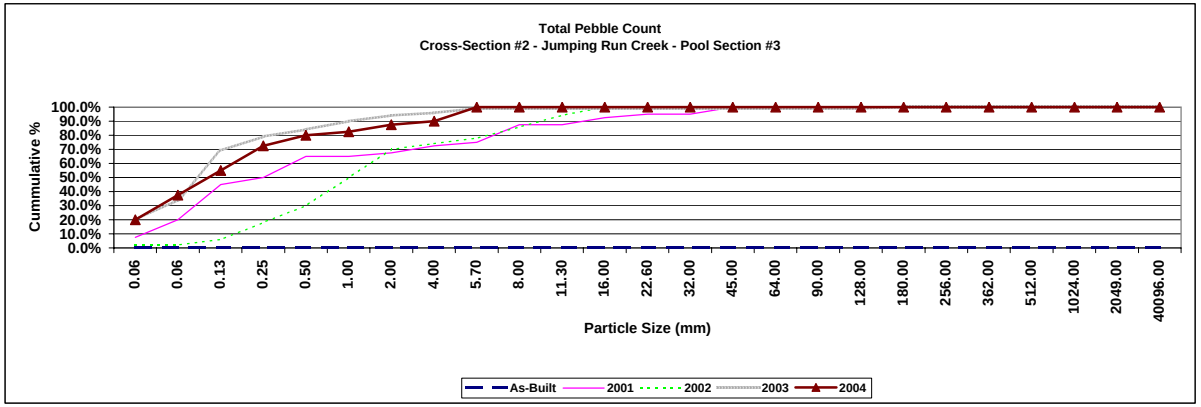
Bankfull Area					
	As-Built	**2001**	**2002**	**2003**	**2004**
Area	27.1	25.97	29.27	28.98	25.32
Width	15.0	15.0	20.3	28.8	12.9
Mean Depth	1.8	1.7	1.4	1.0	2.0
Max Depth	3.6	2.9	3.1	3.1	3.0



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 3
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

		2000	As-Built			2001			2002			2003						2004			
Description	**Material**	**Size (mm)**	**Pool**	**%**	**Cum %**	**Pool**	**%**	**Cum %**	**Pool**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061		0.0%	0.0%	3	7.5%	7.5%	1	2.0%	2.0%	6	14	20.0%	20.0%	12.0%	12.0%	8		20.0%	20.0%
Sand	very fine sand	0.062		0.0%	0.0%	5	12.5%	20.0%	0	0.0%	2.0%	2	12	14.0%	34.0%	4.0%	16.0%	7		17.5%	37.5%
	fine sand	0.125		0.0%	0.0%	10	25.0%	45.0%	2	4.0%	6.0%	22	13	35.0%	69.0%	44.0%	60.0%	7		17.5%	55.0%
	medium sand	0.25		0.0%	0.0%	2	5.0%	50.0%	6	12.0%	18.0%	9	1	10.0%	79.0%	18.0%	78.0%	7		17.5%	72.5%
	course sand	0.50		0.0%	0.0%	6	15.0%	65.0%	6	12.0%	30.0%	5		5.0%	84.0%	10.0%	88.0%	3		7.5%	80.0%
	very course sand	1.0		0.0%	0.0%	0	0.0%	65.0%	10	20.0%	50.0%	6		6.0%	90.0%	12.0%	100.0%	1		2.5%	82.5%
G r a v e l	very fine gravel	2.0		0.0%	0.0%	1	2.5%	67.5%	10	20.0%	70.0%	4		4.0%	94.0%	8.0%	108.0%	2		5.0%	87.5%
	fine gravel	4.0		0.0%	0.0%	2	5.0%	72.5%	2	4.0%	74.0%	2		2.0%	96.0%	4.0%	112.0%	1		2.5%	90.0%
	fine gravel	5.7		0.0%	0.0%	1	2.5%	75.0%	2	4.0%	78.0%	3		3.0%	99.0%	6.0%	118.0%	4		10.0%	100.0%
	medium gravel	8.0		0.0%	0.0%	5	12.5%	87.5%	4	8.0%	86.0%	0		0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	medium gravel	11.3		0.0%	0.0%	0	0.0%	87.5%	4	8.0%	94.0%	0		0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	course gravel	16.0		0.0%	0.0%	2	5.0%	92.5%	3	6.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	course gravel	22.6		0.0%	0.0%	1	2.5%	95.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	very course gravel	32		0.0%	0.0%	0	0.0%	95.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	very course gravel	45		0.0%	0.0%	2	5.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
Cobble	small cobble	64		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	medium cobble	90		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	large cobble	128		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	99.0%	0.0%	118.0%			0.0%	100.0%
	very large cobble	180		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%	1		1.0%	100.0%	2.0%	120.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	small boulder	362		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium boulder	512		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large boulder	1024		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large boulder	2049		0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Bedrock	bedrock	40096	0.01	0.0%	0.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
TOTAL / %of whole count			no data	0.0%		40	100.0%		50	100.0%		60	40	100.0%		120.0%		40	0	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.00	0.00	0.00	0.00	0.00
2001	0.08	0.15	0.38	8.87	8.87
2002	0.34	0.94	1.50	8.95	8.95
2003	0.00	0.10	0.14	0.75	3.93
2004	0.00	0.09	0.16	1.95	5.85



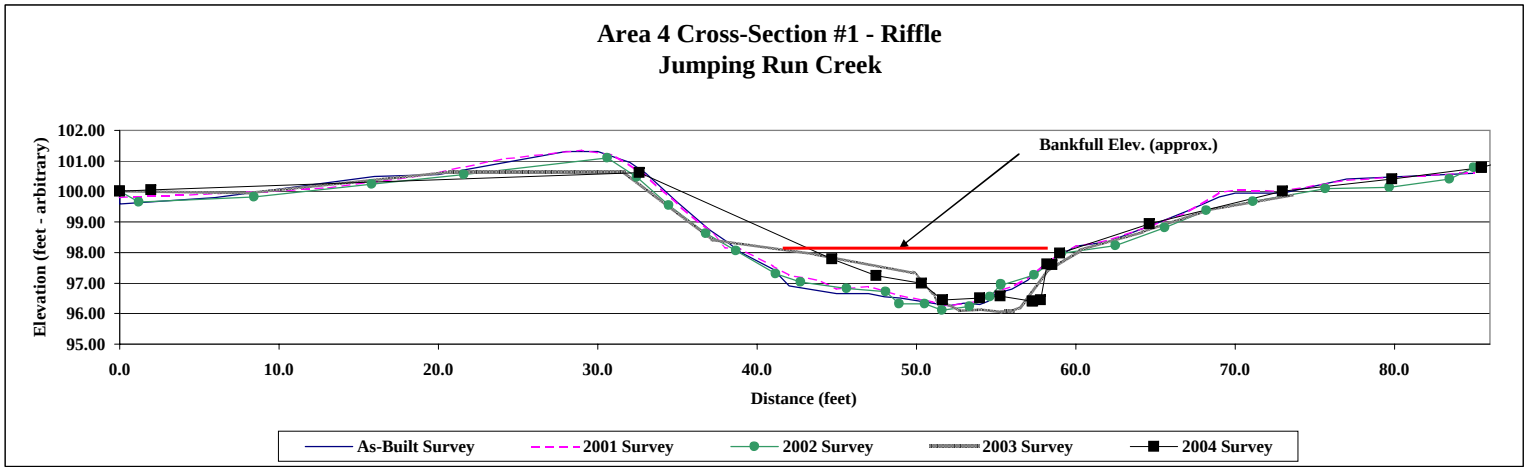
Project Name	Jumping Run Area 4
Cross Section	#1 (pins M-N)
Feature	Riffle
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

*2003 Survey Elevations Adjusted +26.28 ft
*2003 Survey Stations Adjusted -3.94 ft
***2004 elev adjusted up by +28.98ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station****	**Elev***	**Notes**	**Station**	**Elev*****	**Notes**
0.0	100.00	Pin-M	0.0	99.79		0.0	100.01	PIN-M	0	100	PIN-M	0	100	(XSLP1)
0.0	99.58		9.0	99.98		1.2	99.65	G	8.13	99.94		0	100	(XSLP1)
6.0	99.80		13.0	100.11		8.4	99.81	G	20.74	100.63		1.95	100.06	(XSLP)
16.0	100.50		19.0	100.51		15.8	100.25	G	31.69	100.64		32.62	100.61	(XS)
20.0	100.55		24.0	101.05		21.6	100.55	G	37.2	98.41		44.71	97.79	BKF
28.0	101.30		29.0	101.35		30.6	101.09	TOB	43.75	97.94		47.47	97.25	(XS)
30.0	101.30		31.0	101.21		32.5	100.47	G	49.8	97.33	LBF (est)	50.35	97	(XS)
32.0	100.95		33.0	100.53		34.5	99.55	G	51.06	96.66		51.67	96.45	(XS)
33.0	100.60		35.0	99.61		36.8	98.63	G	51.39	96.3		53.97	96.5	(XS)
35.0	99.65		37.0	98.73		38.7	98.05	G	51.41	96.46		55.28	96.57	(XS)
37.0	98.75		38.0	98.17		41.2	97.31	LBF	52.7	96.1		57.29	96.4	(XS)
38.0	98.40		39.0	98.11		42.7	97.03	G	54.12	96.14		57.34	96.4	(XS)
39.0	98.00		41.0	97.56	LBF (est)	45.6	96.83	G	55.37	96.05		57.79	96.45	(XS)
41.0	97.45	LBF (est)	42.0	97.27		48.1	96.71	LEOW	55.62	96.1		58.2	97.62	BKF
42.0	96.90		44.0	97.07		48.9	96.33	CHN	56.06	96.1		58.53	97.59	(XS)
45.0	96.65		45.0	96.81		50.5	96.31	CHN	56.43	96.2		59.02	97.97	(XS)
47.0	96.65		47.0	96.89		51.6	96.11	TW	58.37	97.44	RBF (est)	64.64	98.95	(XS)
48.0	96.55		48.0	96.73		53.3	96.23	CHN	60.31	98.09		72.98	100	(XS)
49.0	96.50		49.0	96.6		54.6	96.55	REOW	64.2	98.67		79.85	100.4	(XS)
51.0	96.35		51.0	96.39		55.3	96.97	G	68.23	99.38		85.46	100.79	(XSRP1)
52.0	96.25		52.0	96.25		55.3	96.93	G	73.62	99.88	PIN N	85.46	100.79	(XSRP1)
53.0	96.35		53.0	96.32		57.4	97.27	RBF	85.19	100.79		85.47	100.79	(X1RP)
54.0	96.30		54.0	96.4		59.1	97.97	G				86.1	100.86	(XSRP)
54.5	96.40		54.5	96.55		62.5	98.23	G						
55.0	96.65		55.0	96.71		65.6	98.81	G						
56.0	96.80		56.0	96.88		68.2	99.37	G						
57.0	97.10		57.0	97.16		71.1	99.67	G						
58.0	97.60	RBF (est)	58.0	97.58	RBF (est)	75.7	100.09	G						
60.0	98.20		59.0	97.96		79.7	100.13	G						
62.0	98.35		60.0	98.21		83.5	100.41	G						
65.0	98.95		62.0	98.39		85.0	100.79	PIN N						
67.0	99.35		65.0	98.91										
69.0	99.81		67.0	99.32										
70	99.95		69.0	99.96										
73	99.95		70.0	100.06										
77	100.4		73.0	100.01										
85	100.6		77.0	100.37										
85	100.79	Pin-N	85.0	100.61										
			85.0	100.8	Pin-N									

Photo of Area 4 Cross-Section #1 - Looking Downstream

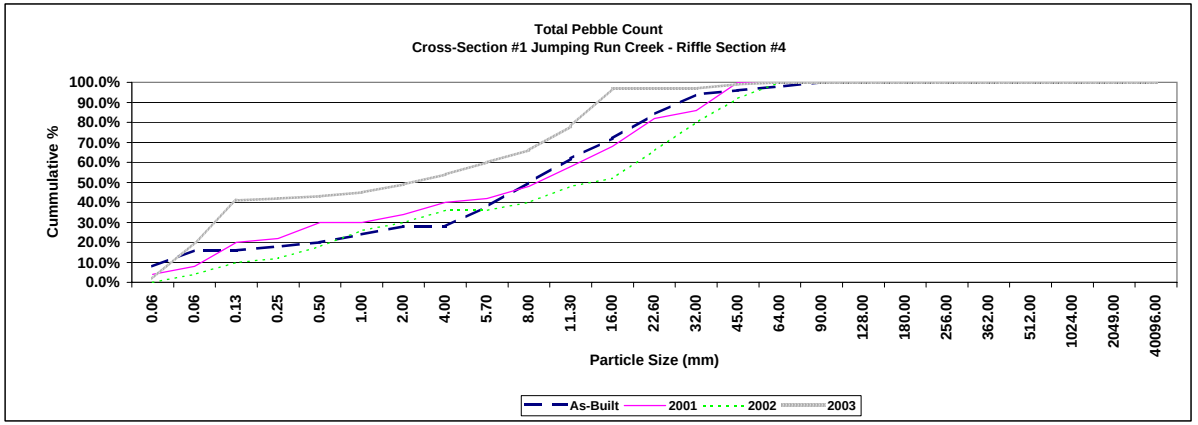
Bankfull Area					
	2000	**2001**	**2002**	**2003**	**2004**
Area	13.5	11.14	11.91	8.58	8.33
Width	17.0	17.0	18.0	8.6	13.5
Mean Depth	0.8	0.7	0.7	1.0	0.6
Max Depth	1.2	1.2	1.3	1.4	1.1
w/d Ratio	21.4	25.9	27.1	8.6	21.8



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#1 Section 3
Feature	Riffle
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

			2000	As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Riffle**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**	**Riffle**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Ban**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	4	8.0%	8.0%	2	4.0%	4.0%		0.0%	0.0%	0	2	2.0%	2.0%	0.0%	0.0%	1		100.0%	100.0%
Sand	very fine sand	0.062	4	8.0%	16.0%	2	4.0%	8.0%	2	4.0%	4.0%	0	18	18.0%	20.0%	0.0%	0.0%			0.0%	100.0%
	fine sand	0.125		0.0%	16.0%	6	12.0%	20.0%	3	6.0%	10.0%	1	20	21.0%	41.0%	2.0%	2.0%			0.0%	100.0%
	medium sand	0.25	1	2.0%	18.0%	1	2.0%	22.0%	1	2.0%	12.0%	1		1.0%	42.0%	2.0%	4.0%			0.0%	100.0%
	course sand	0.50	1	2.0%	20.0%	4	8.0%	30.0%	3	6.0%	18.0%	1		1.0%	43.0%	2.0%	6.0%			0.0%	100.0%
	very course sand	1.0	2	4.0%	24.0%		0.0%	30.0%	4	8.0%	26.0%	2		2.0%	45.0%	4.0%	10.0%			0.0%	100.0%
G r a v e l	very fine gravel	2.0	2	4.0%	28.0%	2	4.0%	34.0%	2	4.0%	30.0%	4		4.0%	49.0%	8.0%	18.0%			0.0%	100.0%
	fine gravel	4.0		0.0%	28.0%	3	6.0%	40.0%	3	6.0%	36.0%	5		5.0%	54.0%	10.0%	28.0%			0.0%	100.0%
	fine gravel	5.7	5	10.0%	38.0%	1	2.0%	42.0%		0.0%	36.0%	6		6.0%	60.0%	12.0%	40.0%			0.0%	100.0%
	medium gravel	8.0	6	12.0%	50.0%	3	6.0%	48.0%	2	4.0%	40.0%	6		6.0%	66.0%	12.0%	52.0%			0.0%	100.0%
	medium gravel	11.3	6	12.0%	62.0%	5	10.0%	58.0%	4	8.0%	48.0%	12		12.0%	78.0%	24.0%	76.0%			0.0%	100.0%
	course gravel	16.0	5	10.0%	72.0%	5	10.0%	68.0%	2	4.0%	52.0%	19		19.0%	97.0%	38.0%	114.0%			0.0%	100.0%
	course gravel	22.6	6	12.0%	84.0%	7	14.0%	82.0%	7	14.0%	66.0%			0.0%	97.0%	0.0%	114.0%			0.0%	100.0%
	very course gravel	32	5	10.0%	94.0%	2	4.0%	86.0%	7	14.0%	80.0%			0.0%	97.0%	0.0%	114.0%			0.0%	100.0%
	very course gravel	45	1	2.0%	96.0%	7	14.0%	100.0%	6	12.0%	92.0%	2		2.0%	99.0%	4.0%	118.0%			0.0%	100.0%
Cobble	small cobble	64	1	2.0%	98.0%		0.0%	100.0%	4	8.0%	100.0%	1		1.0%	100.0%	2.0%	120.0%			0.0%	100.0%
	medium cobble	90	1	2.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large cobble	128		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large cobble	180		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Boulder	small boulder	256		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	small boulder	362		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	medium boulder	512		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	large boulder	1024		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
	very large boulder	2049		0.0%	100.0%		0.0%	100.0%		0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	120.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		60	40	100.0%		120.0%		1	0	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.28	6.25	9.65	27.30	46.50
2001	0.16	3.31	10.45	32.90	32.90
2002	0.63	4.54	16.48	43.83	43.83
2003	0.09	0.16	3.37	15.43	18.71
2004	0.00	0.00	0.00	0.00	0.00



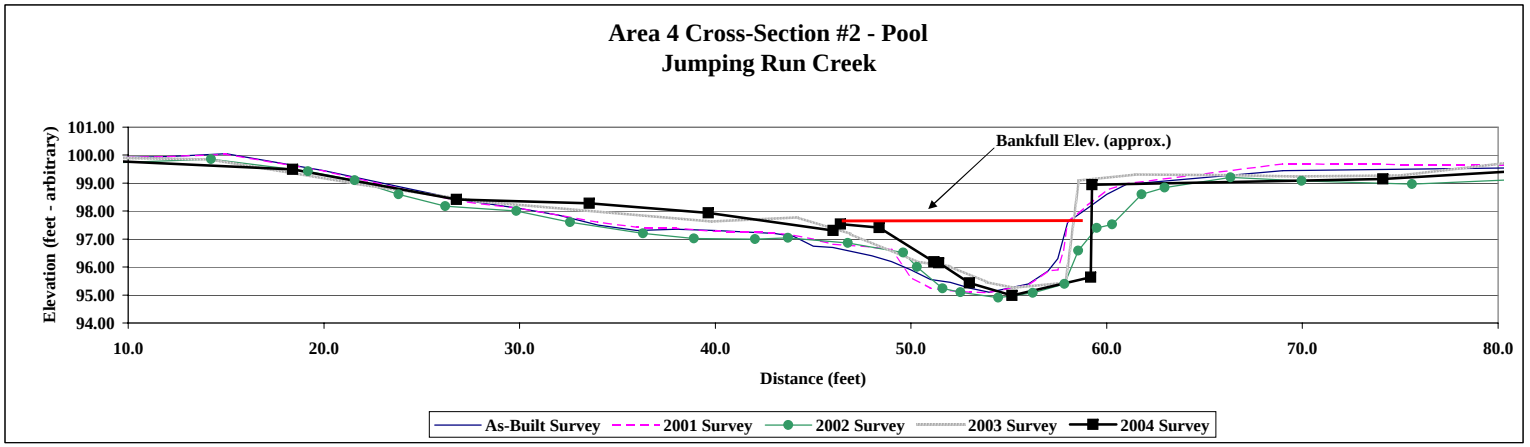
Project Name	Jumping Run Area 4
Cross Section	#2 (pins O-P)
Feature	Pool
Date	10/7/2003
Crew	Shaffer, Bidelspach, Clinton

*2003 Survey Elevations Adjusted +26.46 ft
**2003 Survey Stations Adjusted -3.94 ft
***2004 elev adjusted up by +28.98ft

2000 As-Built Survey			2001 2001 Survey			2002 2002 Survey			2003 2003 Survey			2004 2004 Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station****	**Elev***	**Notes**	**Station**	**Elev*****	**Notes**
0.0	100.00	Pin-O	2.0	99.79		0	100	PIN-O	-2	100	LP2	0	99.83	(X2LP)
0.0	99.70		12.0	99.95		1.07	99.50	G	1.74	99.99		0.2	99.82	(XSLP2)
2.0	99.80		15.0	100.03		8.24	99.70	G	14.23	99.84		0.72	99.84	(X2LP)
12.0	99.95		20.0	99.43		14.24	99.86	G	21.66	98.97		8.9	99.8	(X2)
15.0	100.05		24.0	98.79		19.19	99.42	G	27.77	98.36		18.41	99.49	(X2)
20.0	99.45		27.0	98.35		21.57	99.10	G	39.79	97.63		26.78	98.41	(X2)
24.0	98.85		30.0	98.1		23.81	98.60	G	44.21	97.77		33.57	98.28	(X2)
27.0	98.40		32.0	97.86		26.21	98.18	G	46.92	97.18	LBF (est)	39.64	97.93	(X2)
30.0	98.10		34.0	97.6		29.83	98.00	G	50.27	96.2		46.02	97.31	(X2)
32.0	97.85		36.0	97.42		32.58	97.60	G	51.99	96.03		46.39	97.54	(X2)
34.0	97.50		38.0	97.38		36.32	97.20	G	53.85	95.46		48.37	97.41	BKF
36.0	97.30		40.0	97.27		38.91	97.02	G	55.23	95.26		51.17	96.19	(X2)
38.0	97.35		43.0	97.22		42.03	97.00	G	57.91	95.44		51.41	96.15	(X2W)
40.0	97.30		44.0	97.13	LBF (est)	43.71	97.04	LBF	58	96.03		52.99	95.43	(X2)
43.0	97.20		45.0	97		46.78	96.86	G	58.58	99.09	RBF (est)	55.16	94.98	(X2T)
44.0	97.10	LBF (est)	46.0	96.81		49.61	96.52	LEOW	61.48	99.31		59.19	95.64	(X2W)
45.0	96.75		48.0	96.71		50.31	96.00	CHN	66.05	99.29		59.25	98.94	BKF
46.0	96.70		49.0	96.62		51.61	95.24	CHN	69.58	99.24		74.11	99.15	(X2)
48.0	96.40		50.0	95.62		52.54	95.10	CHN	75.04	99.27		87.15	99.69	(X2RP)
49.0	96.20		51.0	95.25		54.46	94.90	TW	80.66	99.74				
50.0	95.90		52.0	95.15		56.22	95.08	CHN	85.58	99.94	RP2			
51.0	95.55		53.0	95.1		57.85	95.40	CHN						
52.0	95.45		54.0	95.09		58.54	96.58	REOW						
53.0	95.25		55.0	95.24		59.49	97.40	G						
54.0	95.10		56.0	95.35		60.28	97.52	RBF						
55.0	95.25		57.0	95.85		61.78	98.60	G						
56.0	95.40		57.5	95.9		62.96	98.84	G						
57.0	95.85		57.8	96.6		66.34	99.20	G						
57.5	96.30		58.0	97.61	RBF (est)	69.96	99.08	G						
58.0	97.60	RBF (est)	59.0	98.2		75.60	98.96	G						
59.0	98.10		60.0	98.75		81.24	99.14	G						
60.0	98.60		61.0	98.97		85.3	99.30	G						
61.0	98.95		69.0	99.69		87.9	99.52	G						
69	99.45		88.0	99.63		88.7	99.92	PIN-P						
88	99.60		88.0	99.94	Pin-P									
88	99.93	Pin-P												

Photo of Area 4 Cross-Section #2 - Looking Downstream

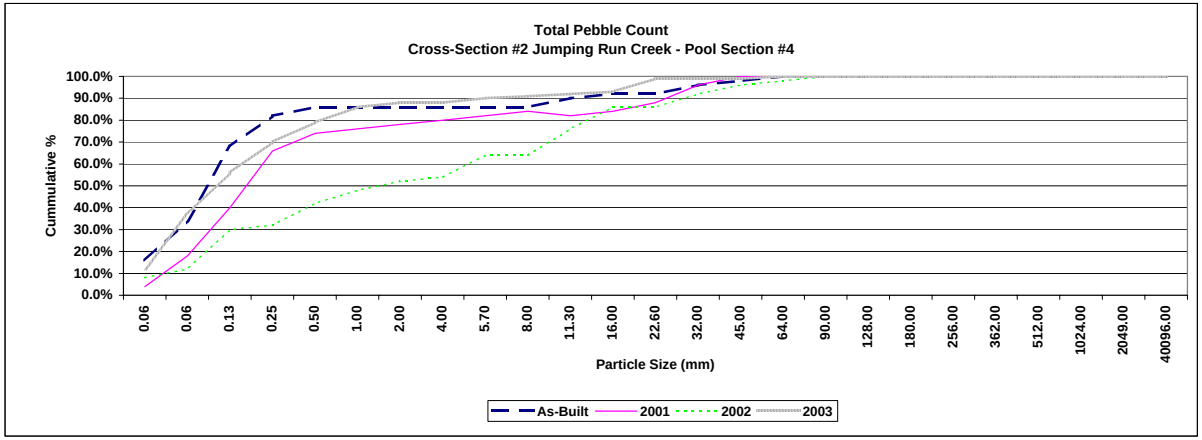
Bankfull Area					
	As-Built	**2001**	**2002**	**2003**	**2004**
Area	15.9	15.98	17.57	13.11	14.94
Width	14.0	14.0	15.8	11.7	12.9
Mean Depth	1.1	1.1	1.1	1.1	1.2
Max Depth	2.0	2.0	2.2	1.8	2.1



Project Name	Payne Dairy - Jumping Run Creek
Cross Section	#2 Section 4
Feature	Pool
Date	9/30/03
Crew	Shaffer, Bidelspach, Clinton

			2000	As-Built			2001			2002			2003					2004			
Description	**Material**	**Size (mm)**	**Pool**	**%**	**Cum %**	**Pool**	**%**	**Cum %**	**Pool**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	8	16.0%	16.0%	2	4.0%	4.0%	4	8.0%	8.0%	3	9	12.0%	12.0%	6.0%	6.0%	1		100.0%	100.0%
Sand	very fine sand	0.062	9	18.0%	34.0%	7	14.0%	18.0%	2	4.0%	12.0%	3	22	25.0%	37.0%	6.0%	12.0%			0.0%	100.0%
	fine sand	0.125	17	34.0%	68.0%	11	22.0%	40.0%	9	18.0%	30.0%	17	2	19.0%	56.0%	34.0%	46.0%			0.0%	100.0%
	medium sand	0.25	7	14.0%	82.0%	13	26.0%	66.0%	1	2.0%	32.0%	14		14.0%	70.0%	28.0%	74.0%			0.0%	100.0%
	course sand	0.50	2	4.0%	86.0%	4	8.0%	74.0%	5	10.0%	42.0%	9		9.0%	79.0%	18.0%	92.0%			0.0%	100.0%
	very course sand	1.0	0	0.0%	86.0%	1	2.0%	76.0%	3	6.0%	48.0%	7		7.0%	86.0%	14.0%	106.0%			0.0%	100.0%
G r a v e l	very fine gravel	2.0	0	0.0%	86.0%	1	2.0%	78.0%	2	4.0%	52.0%	2		2.0%	88.0%	4.0%	110.0%			0.0%	100.0%
	fine gravel	4.0	0	0.0%	86.0%	1	2.0%	80.0%	1	2.0%	54.0%	0		0.0%	88.0%	0.0%	110.0%			0.0%	100.0%
	fine gravel	5.7	0	0.0%	86.0%	1	2.0%	82.0%	5	10.0%	64.0%	2		2.0%	90.0%	4.0%	114.0%			0.0%	100.0%
	medium gravel	8.0	0	0.0%	86.0%	1	2.0%	84.0%	0	0.0%	64.0%	1		1.0%	91.0%	2.0%	116.0%			0.0%	100.0%
	medium gravel	11.3	2	4.0%	90.0%	-1	-2.0%	82.0%	6	12.0%	76.0%	1		1.0%	92.0%	2.0%	118.0%			0.0%	100.0%
	course gravel	16.0	1	2.0%	92.0%	1	2.0%	84.0%	5	10.0%	86.0%	1		1.0%	93.0%	2.0%	120.0%			0.0%	100.0%
	course gravel	22.6	0	0.0%	92.0%	2	4.0%	88.0%	0	0.0%	86.0%	6		6.0%	99.0%	12.0%	132.0%			0.0%	100.0%
	very course gravel	32	2	4.0%	96.0%	4	8.0%	96.0%	3	6.0%	92.0%			0.0%	99.0%	0.0%	132.0%			0.0%	100.0%
	very course gravel	45	1	2.0%	98.0%	2	4.0%	100.0%	2	4.0%	96.0%			0.0%	99.0%	0.0%	132.0%			0.0%	100.0%
Cobble	small cobble	64	1	2.0%	100.0%	0	0.0%	100.0%	1	2.0%	98.0%	1		1.0%	100.0%	2.0%	134.0%			0.0%	100.0%
	medium cobble	90	0	0.0%	100.0%	0	0.0%	100.0%	1	2.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	large cobble	128	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	very large cobble	180	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
Boulder	small boulder	256	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	small boulder	362	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	medium boulder	512	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	large boulder	1024	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
	very large boulder	2049	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
Bedrock	bedrock	40096	0	0.0%	100.0%	0	0.0%	100.0%	0	0.0%	100.0%			0.0%	100.0%	0.0%	134.0%			0.0%	100.0%
TOTAL / %of whole count			50	100.0%		50	100.0%		50	100.0%		67	33	100.0%		134.0%		1	0	100.0%	

	d16	**d35**	**d50**	**d84**	**d95**
As-Built	0.06	0.10	0.14	0.56	35.70
2001	0.09	0.17	0.26	28.95	28.95
2002	0.11	0.49	2.25	18.17	18.17
2003	0.07	0.09	0.16	1.29	21.97
2004	0.00	0.00	0.00	0.00	0.00



Project Name Jumping Run Area 1
Task Longitudinal Profile
Section Area #1
Date 10/7/03
Crew Shaffer, Bidelspach, Clinton

Symbol Key	
T	Thalweg
TR	Head of Riffle
TP	Head of Pool
TU	Head of Run
TM	Max Pool

2004 Survey* * 2004 elev adjusted up by 1.0 ft

TW Station	TW Elevation	WS Station	WS Elevation	BKF Station	BKF Elevation	Feature
11.05	94.85	10.72	95.35	1.36	96.38	TR
21.46	94.86	21.14	95.28	32.24	95.79	T
30.35	94.64	30.15	95.3	32.74	95.83	T
42.9	94.81	42.91	95.26	53.86	96.34	T
52.71	94.62	53.06	95.15	68.04	95.84	TP
69.12	94.58	68.92	95.11	69.51	96.4	T
89.43	94.36	89.24	95.1	89.92	95.81	TR
98.42	94.61	98.61	95	111.86	95.51	T
106.18	94.56	106.66	95.02	122.07	95.93	T
113.22	94.47	114.12	94.95	122.17	95.95	T
122.14	94.21	121.1	94.95	129.28	95.93	T
131.31	94.37	131.02	94.87	134.95	95.57	T
146.42	94.43	146.23	94.8	145.62	95.95	TP
149.83	93.87	149.46	94.2	155.8	95.66	T
160.3	92.42	164.97	93.53	158.76	95.48	T
163.72	93.22	171.18	93.46	167.07	95.18	T
171.17	93.42	186.34	93.34	174.56	94.66	TR
186.08	92.96	195.26	93.24	183.73	94.43	T
194.01	92.58	199.42	93.24	187.46	94.3	T
199.53	92.82	215.77	93.17	189.32	94.23	T
215.9	92.74	232.25	93.12	192.84	94.56	T
232.13	92.66	240.03	93	198.63	94.45	T
239.94	92.46	251.92	92.97	200.09	94.42	TP
251.96	91.85	253.08	93	217.23	94.48	T
253.24	91.27	258.21	92.94	224.1	93.85	T
257.91	92.4	266.96	92.93	225.44	93.96	T
267	92.29	275.59	92.18	225.6	94.02	T
272.31	92.66	280.63	92.22	239.95	93.87	T
275.84	90.87	286.75	92.21	245.11	94.32	TP
280.52	90.31	294.95	92.18	253.5	94.31	T
286.96	91.47	304.43	92.2	269.87	93.43	T
295.26	91.78	310.34	92.24	273.81	94.03	T
304.32	91.68	313.45	92.1	277.13	93.83	T
310.87	91.79	325.26	92.01	282.94	93.83	TR
314.01	91.88	341.74	91.91	292.83	93.45	T
325.58	91.36			303.34	92.57	T
341.86	91.51			311.74	92.55	T
350.56	91.87			322.36	92.44	
				324.16	92.49	
				332.57	93.21	
				336.09	94.66	
				347.93	92.73	
				349.71	93.46	

2003 Survey

TW Station	TW Elevation	WS Station	WS Elevation	LBKF Station	LBKF Elevation	RBKF Station	RBKF Elevation	Feature
0.16	95.21	0	95.46	9.89	97.25	14.94	97.6	T
39.84	94.47	21.67	95.45	37.83	96.74			TU
58.23	94.53	39.48	95.42	59.36	96.36	59	96.44	TP
62.53	94.03	58.18	95.35					TM
75.05	94.47	62.59	95.42					T
77.17	94.38	74.69	95.27					TU
80.43	94.2	76.17	95.37					T
82.06	94.23	76.77	95.34					T
85.53	94.59	80.48	95.35					T
90.72	94.18	81.26	95.36					T
99.89	94.09	85.62	95.28					T
106.61	94.66	90.01	95.28			101.11	95.94	T
109.26	94.52	99.69	95.26					TP
113.73	93.92	109.56	95.22	116.66	96.25			T
125.4	94.05	113.56	95.18					TM
133.38	94.23	125.74	95.09			137.63	95.97	TR
147.74	94.38	133.22	95.05					LV
148.08	93.82	140.21	94.89			150.52	95.7	T
154.87	93.57	147.71	94.4	154.74	95.42			TU
160.17	92.7	148.01	94.27					TP
164.16	92.12	155.12	93.84					TM
171.73	93.17	159.9	93.8			170.54	95.45	T
181.82	92.83	163.87	93.9	185.23	95.02			TR
191.54	92.57	171.95	93.9					TP
193.61	92.06	181.71	93.78					TM
200.17	92.75	191.78	93.57					TU
206.35	92	193.07	93.56					T
217.77	92.4	200.26	93.55	221.74	94.72	212.89	94.64	T
229.77	92.6	206.19	93.58					T
241.02	92.18	217.75	93.53					TP
246.1	91.46	229.93	93.55			249.4	94.09	TM
253.84	93.11	241.14	93.47	252.48	94.35			T
269.57	92.42	245.9	93.46	264	94.11			TR
274.94	92.69	253.65	93.46					V
279.78	90.57	269.22	93.26					TM
284.66	91.94	274.57	93.18	289.51	93.84			T
294.53	91.72	279.87	92.73			291.98	93.81	T
		284.38	92.78					

2002 Survey
Conducted by S&EC, PA, Inc

Previous surveys elevations adjust **5.8**

Original Station	Original TW Elevation		Adjusted Station	Adjusted TW Elevation
0	100.13	TW FNC	0	94.33
12	100.89	TOP Vane	12	95.09
23	98.53	TWP	23	92.73
29	99.87	TWG	29	94.07
51	99.87	TWR	51	94.07
80	99.97	-Riffle X-sec	80	94.17
101	99.71	TWR	101	93.91
123	99.21	TWP	123	93.41
129	99.75	TWG	129	93.95
144	99.97	TWRI	144	94.17
157	100.03	TOP Vane	157	94.23
175	98.09	TWR	175	92.29
186	98.69	TWRI	186	92.89
192	98.29	TWP	192	92.49
200	98.89	TWRI	200	93.09
205	98.01	TWS	205	92.21
212	98.21	TWHC	212	92.41
220	97.67	TWS	220	91.87
225	98.31	TWG	225	92.51
247	98.33	TWRI	247	92.53
257	97.57	TW Pool	257	91.77
259	97.75	Pool X-sec	259	91.95
268	98.17	TWG	268	92.37
275	98.03	TWRI	275	92.23
284	98.35	TOP Vane	284	92.55

2001 Survey
Conducted by K-H & Assoc., Inc

Original Station	Original TW Elevation		Adjusted Station		Adjusted TW Elevation
0					
20			20		
25	99.3		25		93.5
29	100.2		29		94.4
35	100		35		94.2
44	100.15		44		94.35
64	100.2		64		94.4
73	100.25		73		94.45
79	100.25		79		94.45
90	100.2		90		94.4
103	99.88		103		94.08
117	100.05		117		94.25
123	99.6		123		93.8
128	99.8		128		94
138	99.83		138		94.03
151	100.15		151		94.35
158	100.05	check dam	158		94.25
163	99.45		163		93.65
170	99.15		170		93.35
181	98.25	s of log struc	181		92.45
186	99.03		186		93.23
196	98.79		196		92.99
210	99.27		210		93.47
216	99.05	op of headcu	216		93.25
218	97.35	tom of head	218		91.55
224	98.09		224		92.29
232	98.64		232		92.84
245	98.44		245		92.64
252	98.45		252		92.65
262	97.57		262		91.77
269	97.93		269		92.13
279	98.25		279		92.45
284.5	98.36		284.5		92.56
287	98.15	Lock Structur	287		92.35
		Year 1 - Head cut observed at Station 218			

2000 As-built
Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run Area 1 Alexander County, NC			Adjusted Station	Adjusted Elevation
Station	TW	Notes		
0	100.14		0	94.34
11.1	100.89	top of rock cross vane	11.1	95.09
15	99.04	pool	15	93.24
20	98.84		20	93.04
25	99.34		25	93.54
29	99.89	end pool/begin glide	29	94.09
35	100.04		35	94.24
44	100.19		44	94.39
64	100.14		64	94.34
73	100.39	top riffle/end glide	73	94.59
79	100.19	xsection riffle	79	94.39
90	100.24	end riffle	90	94.44
103	100.14		103	94.34
117	100.09	log vane	117	94.29
123	99.54	d/s log vane	123	93.74
128	99.54	center of pool	128	93.74
138	99.94	end pool	138	94.14
151	100.14	start riffle	151	94.34
158	100.04	center of notch in log	158	94.24
163	99.54		163	93.74
170	99.19		170	93.39
181	98.19		181	92.39
186	99.14		186	93.34
196	98.79	center of pool	196	92.99
210	99.34	end pool	210	93.54
214	99.04	begin riffle	214	93.24
219	98.84	center of riffle	219	93.04
232	98.69		232	92.89
245	98.59		245	92.79
252	98.49	end run/begin pool	252	92.69
262	97.39	center of pool	262	91.59
269	98.24		269	92.44
279	98.44		279	92.64
284.5	98.39	center of rock struc	284.5	92.59

Project Name Jumping Run
Task Longitudinal Profile
Section: Area #2
Date 10/7/03
Crew Shaffer, Bidelspach, Clinton

Symbol Key

T	Thalweg
TR	Head of Riffle
TP	Head of Pool
TU	Head of Run
TM	Max Pool

2003 Survey

2003 TW Station	TW Station	TW Elevation	WS Station	WS Elevation	LBKF Station	LBKF Elevation	Feature
0	53.3	86.39	55.32	85.95	164.9	88.24	TM
17.8	56.22	87.15	61.76	85.77	211.19	86.48	TR
26.27	60.98	86.96	73.61	86.02	215.77	86.63	TU
35.88	73.98	86.79	80.2	85.69	225.42	88.09	TP
40.8	80.02	86.63	86.01	93.4	230.57	86.93	TM
50.74	85.23	86.71	86.08	84.78	233.84	86.19	T
53.63	91.23	87.77	90.28	85.48	235.75	86.03	CV
55.49	92.13	86.98	101.69	85.48	252.46	85.24	T
59.17	101.83	84.9	108.4	85.52	261.36	85.95	TM
65.32	108.28	85.59	114.85	85.47	266.58	86.54	T
73.02	116.12	86.86	123.73	85.66	289.53	85.46	TR
93.63	123.57	86.12	130.86	85.11	295.09	86.98	TP
103.06	131.18	85.79	140.93	85.73	309.73	85.81	TM
108.12	140.66	86.69	148.91	85.5	310.59	85.64	TR
113.19	150.16	86.09	200.51	89.03	317.89	86.11	TU
123.18	198.82	85.41	210.36	85.28	321.61	85.12	TP
132.03	201.36	85.05	216.36	85.23	340.06	87.02	T
139.33	210.76	85.23	229.29	85.16	346	84.93	T
155.6	217.05	86	238.36	85.21	381.63	84.92	T
162.04	229.15	86.25	267.36	84.87	390.14	86.56	T
166.2	238.34	86.46	276.68	84.75	390.93	85.11	TP
168.03	251.28	86.31	285.53	84.49	399.15	85.59	T
181.62	267.06	84.93	300.52	84.51	410.04	84.45	TM
192.39	277.43	86.48	307.19	84.52	414.46	84.77	T
195.78	285.69	86.82	311.55	84.49	415.92	84.5	CV
196.3	299.83	86.85	317.57	84.75	433.18	85.1	CV
203.32	306.76	84.18	324.17	84.31	436.51	85.13	T
213.7	310.99	86.63	329.8	84.27	445.7	84.54	TR
220.23	317.35	85.79	344.53	84.29	446.96	84.71	TP
226.15	324.57	83.74	355.19	84.28	452.96	84.76	TM
230.93	329.94	84.66	368.91	84.12	452.96	84.93	T
240.23	344.47	86.53	385.59	84.07	457.15	84.7	TR
249.09	355.47	85.76	400.98	84.09	457.89	84.85	TU
249.44	363.81	86.62	416.12	83.85	468.36	84.46	TU
253.77	368.78	85.47	416.39	83.84	470.94	84.22	TP
257.79	385.67	84.82	425.24	83.85	491.83	84.69	TM
265.45	400.93	85.09	437.07	83.86	501.29	84.19	T
275.86	415.91	85.38	449.94	83.76	502.35	83.65	T
280.23	416.57	86.25	461.45	83.53	508.7	83.68	TR
288.24	426.11	85.77	475.26	83.47	509.25	83.7	TP
292.82	437.07	84.1	483.83	83.49	512.19	84.17	T
299.19	449.78	84.24	487.42	83.25	523.63	83.92	TM
307.01	461.57	85.41	492.95	83.38	542.49	83.9	T
313.81	474.39	84.76	501.78	83.26	545.25	84.08	T
318.2	482.79	85.71	513.79	83.21	556.42	83.65	TR
324.39	486.99	85.14	520.01	83.19	55.82	88.13	TP
329.62	492.66	84.13	526.46	83.23	57.57	88.83	TM
346.8	501.9	85.02	543.25	83.13	74.43	86.62	T
349.99	514.54	84.33	558.95	82.83	84.48	87.59	T
362.3	520.43	85.44			85.92	86.86	CV
367.43	526.09	83.48			117.13	86.24	TM
375.09	543.07	84.3			117.92	86.76	T
386.52	559.11	83.26			128.07	86.12	TM
404.96							TR
420.34							TP
427.25							TM

TW Station	TW levatic	WS Station	WS Elevation	LBKF Station	LBKF Elevation	RBKF Station	RBKF levatio	Feature
0	86.39	18.06	87.46	0.5	89.2			TM
17.8	87.15	26.25	87.4					TR
26.27	86.96	35.45	87.42	28.93	89.15			TU
35.88	86.79	40.23	87.42			33.37	89.25	TP
40.8	86.63	51.12	87.39					TM
50.74	86.71	55.31	87.41					T
53.63	87.77	64.52	87.4					CV
55.49	86.98	72.96	87.35	57.33	89.9			T
59.17	84.9	82.23	87.16			61.47	89.5	TM
65.32	85.59	92.26	87.13					T
73.02	86.86	102.52	87.18					TR
93.63	86.12	108.34	87.12	92.09	90.01			TP
103.06	85.79	112.58	87.04					TM
108.12	86.69	122.29	87.05					TR
113.19	86.09	131.13	87.02					TU
123.18	85.41	138.96	87	118.2	90.2	118.98	89.33	TP
132.03	85.05	155.6	87.05					T
139.33	85.23	161.29	87.06	136.2	89.86			T
155.6	86	165.93	87.05	155.16	89.96	147.16	89.32	T
162.04	86.25	167.7	87.05					T
166.2	86.46	181.52	87.03			167.31	90.36	TP
168.03	86.31	195.84	87.01					T
181.62	84.93	196.15	86.99	186.93	89.8			TM
192.39	86.48	203.88	87.01	188.78	89.63			T
195.78	86.82	214.28	86.99					CV
196.3	86.85	220.34	86.89					CV
203.32	84.18	231.05	86.83			206.05	89.86	T
213.7	86.63	240.3	86.83			214.41	89.47	TR
220.23	85.79	253.91	86.64					TP
226.15	83.74	257.61	86.65					TM
230.93	84.66	265.47	86.66			233.55	88.44	T
240.23	86.53	275.2	86.64					TR
249.09	85.76	276.68	86.61					TU
249.44	86.62	280.35	86.62					TU
253.77	85.47	288	86.16	251.1	89.31			TP
257.79	84.82	293.88	86.19	259.44	89.11			TM
265.45	85.09	298.29	86.11					T
275.86	85.38	306.83	86.24	272.42	89.05			T
280.23	86.25	314.03	86.17			278.99	88.44	TR
288.24	85.77	317.85	86.16					TP
292.82	84.1	324.97	85.64			291.49	88.56	T
299.19	84.24	346.43	85.69			300.85	88.51	TM
307.01	85.41	349.25	85.65					T
313.81	84.76	362.39	85.64					T
318.2	85.71	366.86	85.54					TR
324.39	85.14	374.69	85.52	320.11	88.51			TP
329.62	84.13	387.23	85.55					TM
346.8	85.02	404.92	85.52	340.17	88.27			T
349.99	84.33	419.87	85.37					T
362.3	85.44	426.41	85.35			362.74	88.54	CV
367.43	83.48							TM
375.09	84.3			375.05	88.17			T
386.52	83.26			388.01	87.68			TM
404.96	85.22			401.45	87.5			TR
420.34	84.33					411.45	87.32	TP
427.25	82.91							TM

2002 Survey
Conducted by S&EC, PA, Inc
***** Previous stationng adjusted downstream by: 53***
**** Previous surveys elevations adjusted down by:11.39***

Original Station	Original TW Elevation		Adjusted Station**	Adjusted TW Elevation*
-53	97.84	TWP	0	86.45
-41	98.1	TWG	12	86.71
-24	98.46	TWR	29	87.07
-13	97.58	TWP	40	86.19
3	99.16	TOP Vane	56	87.77
7	96.14	TWP	60	84.75
13	97.38	TWG	66	85.99
21	97.4	TWRI	74	86.01
29	96.6	TWP	82	85.21
56	97.4	TWRI	109	86.01
67	97	TWR	120	85.61
77	96.04	TWP	130	84.65
84	96.14	Pool X-sec.	137	84.75
94	96.38	TWP	147	84.99
129	96.26	TWP	182	84.87
142	97.86	TOP Vane	195	86.47
147	94.84	TWP	200	83.45
155	96.64	TWG	208	85.25
162	96.86	TWRI	215	85.47
172	95.68	TWP	225	84.29
186	96.92	TWRI	239	85.53
194	96.6	TWR	247	85.21
204	95.4	TWP	257	84.01
213	96.3	TWG	266	84.91
223	96.6	Riffle X-sec	276	85.21
244	95.02	TWP	297	83.63
250	96.18	TWG	303	84.79
268	96.34	TWRI	321	84.95
281	95.1	TWP	334	83.71
296	96.1	TWG	349	84.71
313	96.52	TOP Vane	366	85.13

2001 Survey
Conducted by K-H & Assoc., Inc

Original Station	Original TW Elevation		Adjusted Station**	Adjusted TW Elevation*
0	98.92	rock st	53	87.53
2.5	99.19		55.5	87.8
3	98.21		56	86.82
5	96.23	p of fo	58	84.84
7	95.84	tour po	60	84.45
11	97.06		64	85.67
14	97.96		67	86.57
20	97.53		73	86.14
22	97.54		75	86.15
29	97.29		82	85.9
34	97.16		87	85.77
36	97.17		89	85.78
40	96.74		93	85.35
44	97.07		97	85.68
48	97.08		101	85.69
52	97.3		105	85.91
63	97.4		116	86.01
71	97.23		124	85.84
82	96.59	ter of	135	85.2
92	96.71		145	85.32
100	96.93		153	85.54
108	97.17		161	85.78
113	96.69		166	85.3
123	96.42	ter of	176	85.03
132	96.48		185	85.09
143	97.85		196	86.46
146	95.3	tour po	199	83.91
153	95.4		206	84.01
156	96.65	nd poo	209	85.26
160	97.29		213	85.9
165	97.51		218	86.12
168	96.94	p of po	221	85.55
171	96.54		224	85.15
173	95.89	ter of	226	84.5
177	96.04		230	84.65
180	96.53		233	85.14
183	96.94		236	85.55
187	97.03		240	85.64
190	96.93		243	85.54
192	96.79		245	85.4
195	96.83		248	85.44
198	96.59		251	85.2
201	96.21		254	84.82
203	96.14		256	84.75
205	96.13		258	84.74
208	96.19		261	84.8
211	96.2		264	84.81
213	96.45		266	85.06
218	96.59		271	85.2
221	96.83		274	85.44
224	96.79		277	85.4
227	96.68		280	85.29
230	96.67		283	85.28
233	96.68		286	85.29
236	96.38		289	84.99
239	95.29		292	83.9
245	95.51		298	84.12
247	95.52		300	84.13
249	95.84		302	84.45
252	96.48		305	85.09
255	96.52		308	85.13
258	96.53		311	85.14
261	96.58		314	85.19
264	96.54		317	85.15
268	96.48	p of po	321	85.09
272	95.27		325	83.88
274	95.31		327	83.92
281	95.24		334	83.85
285	95.11		338	83.72
289	95.32		342	83.93
292	95.96		345	84.57
297	96.49		350	85.1
301	96.24		354	84.85
305	96.54		358	85.15
309	96.64		362	85.25
310	96.66	rock st	363	85.27

2000 As-built
Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run
Alexander County, NC

Station	TW	Notes	Adjusted Station**	Adjusted Elevation*
0	99.02		53	87.63
3	98.22	rock/	56	86.83
4	96.97	s foot	57	85.58
7	96.07		60	84.68
11	97.62		64	86.23
14	97.87		67	86.48
20	97.07	ter of	73	85.68
22	96.4	gin pl	75	85.01
29	95.9	ter of	82	84.51
34	95.65		87	84.26
36	95.55		89	84.16
48	96.87		101	85.48
60	97.47		113	86.08
71	97.32		124	85.93
82	96.47	ss sect	135	85.08
106	97.32		159	85.93
113	96.72		166	85.33
118	96.37	ter of	171	84.98
128	95.92		181	84.53
143	97.82	rock st	196	86.43
144	97.12	foote	197	85.73
145	95.32		198	83.93
148	94.77		201	83.38
154	96.22		207	84.83
157	96.97		210	85.58
164	96.87		217	85.48
170	96.42		223	85.03
174	95.72	ter of	227	84.33
180	96.57	nd poo	233	85.18
186	96.97	gin rif	239	85.58
190	96.92	er of r	243	85.53
195	96.77	ffle/be	248	85.38
199	96.27	m/beg	252	84.88
204	96.27	ter of	257	84.88
212	96.37	nd poo	265	84.98
218	96.42		271	85.03
225	96.82	er of r	278	85.43
228	96.57	ffle/be	281	85.18
237	96.42	m/beg	290	85.03
241	95.27	ter of	294	83.88
250	96.02		303	84.63
255	96.62	riffle	308	85.23
265	96.57		318	85.18
268	96.52	gin po	321	85.13
279	95.12	ter of	332	83.73
289	95.12	nd poo	342	83.73
296	96.42		349	85.03
300	96.22		353	84.83
313	rock structure			

Project Name Jumping Run
Task Longitudinal Profile
Section: Area #3
Date 10/7/03
Crew Shaffer, Bidelspach, Clinton

Symbol Key	
T	Thalweg
TR	Head of Riffle
TP	Head of Pool
TU	Head of Run
TM	Max Pool

2004 Survey* * 2004 elev adjusted up by 2.50 ft

TW Station	TW Elevation	WS Station	WS Elevation	LBKF Station	LBKF Elevation	RBKF Station	RBKF Elevation	Feature
13.42	75.68	13.52	76.28	11.94	77.22			TR
35.71	75.59	31.81	76.11	15.18	76.74			TP
66.33	74.85	33.1	76	27.73	79.42			T
73.41	75.51	50.05	75.8	38.9	76.47			TR
78.2	75.63	67.16	75.93	48.87	76.65			T
97.37	75.03	72.08	76.04	50.28	77.63			T
97.96	75.14	79.08	75.91	62.71	77.05			T
98.23	75.78	96.6	75.5	65.57	77.06	67.59	77.95	T
109.15	74.02	98.7	75.37	77.19	76.78	86.4	77.47	TP
111.76	74.24	110.47	75.2	87.69	76.99			T
114.11	75.33	112.9	75.37	113.45	76.75			T
114.83	74.78	117.47	75.08	120.55	76.04			T
123.73	74.35	122.86	75.2	130.62	75.74			T
133.17	73.08	132.83	75.09	137.56	76.61			T
140.7	73.38	140.77	75.14	150.1	76.67			T
146.38	74.72	145.93	75.08	155.57	76.15	129.02	76.91	T
155.54	73.87	155.92	75.18	161.06	76.12			T
168.99	74.86	169.01	75.24	182.37	76.23			TR
183.86	74.48	183.68	74.94	182.67	76.85			T
195.39	72.63	196.17	74.82	189.93	76.9	154.76	76.83	TP
202.67	72.15	199.8	75.01	203.52	76.02			T
214.54	74.14	214.67	74.92	207.37	76.97			T
221.09	74.59	220.61	74.91	217.02	76.19			TR
227.89	74.39	227.7	74.65	226.57	75.58			T
234.56	74.13	234.72	74.49	248.69	76			T
242.17	73.9	241.73	74.46	260.91	75.73	205.78	76.57	T
247.76	73.25	247.49	74.33	263.41	75.23			T
248.88	73.05	249.76	74.25	280.58	75.07			TP
248.94	74.54	257.94	74.27	285.85	76.72			T
258	73.53	270.02	74.13	288.65	74.71	244.73	76.38	T
269.56	73.7	277.33	74.23	292.65	76.62			T
277.1	73.41	285.63	74.15	301.42	76.14			T
285.5	73.73	291.3	73.71	307.63	75			T
292.06	72	306.54	73.79	311.92	75.42			TP
306.76	71.75	318.26	73.68	317.69	74.96			T
317.97	72.52	328.24	73.78	329.7	75.03			T
328.51	73.32	332.18	73.55	332.18	75.19			TR
331.5	73.03	336.3	73.53	341.39	74.76			T
335.91	73.2	345.84	73.22	350.88	74.2			T
345.06	72.32	354.79	73.21	351.36	75.14			TP
353.86	70.42	379.99	73.25	362.94	74.8	318.2	76	T
362.96	71.06	388.52	73.18	368.46	74.42			T
371.76	71.64	393.11	73.1	376.57	75.16			T
378.28	72.34	398.06	72.99	382.8	74.09	334.63	75.41	T
387.3	72.67	410.27	72.94	397.07	75.12			TR
392.22	72.55	416.5	72.65	406.85	74.53			T
398.11	70.87			407.33	73.64			T
406.44	71.67							T
409.98	72.59							T
416.78	72.36							T

2003 Survey

TW Shot number	TW Station	TW Elevation	WS Station	WS Elevation	LBKF Station	LBKF Elevation	RBKF Station	RBKF Elevation	Feature
3	0	76.41	0.04	77.15					T
5	8.03	76.18	7.75	77.06	11.56	78.77			T
7	19.48	76.13	19.37	76.85					T
9	24.01	76.2	23.83	76.75					T
11	31.21	76.06	31.39	76.67					T
13	37.76	75.12	35.11	76.58					TP
15	46.04	73.73	56.92	76.55					TM
17	57.3	75.28	74.47	76.58	66.85	77.64	67.59	77.95	T
19	74.88	75.94	98.1	76.14	81.94	78	86.4	77.47	TR
23	95.08	75.38	101.07	75.98					T
21	99.33	76.05	108.48	75.83					LV
26	109.32	73.94	116.34	75.89	105.09	78.02			TM
28	115.13	74.83	128.56	75.86					T
30	122.06	74.61	136.9	75.86	121.47	77.61			TU
31	123.29	75.62	143.49	75.86					T
32	129.1	73.48	150.82	75.9			129.02	76.91	TP
34	134.72	73.03	164.66	75.91					TM
36	142.44	74.02	175.27	75.73					T
38	150.2	74.8	188.1	75.49					T
40	154.88	73.72	192.23	75.46			154.76	76.83	T
41	164.65	74.99	193.24	75.46	160.31	77.2			TR
43	175.36	74.9	202.94	75.48					T
45	187.32	74.49	209.96	75.47					TU
48	191.48	73.61	219.35	75.46					TP
50	193.4	72.93	223.67	75.37					T
52	200.81	72.25	238.94	75.24	202.93	77.14	205.78	76.57	TM
54	210.03	73.54	249.76	74.85					T
56	219.35	74.78	253.24	74.73					T
58	222.58	74.83	262.96	74.7					TR
60	238.97	74.42	270.97	74.65	235.87	76.84	244.73	76.38	T
62	249.29	74.73	279.07	74.6					LV
65	249.55	74.64	286.74	74.36					T
66	253.61	73.39	288.56	74.23					TM
68	263.08	73.68	294.77	74.22					T
70	270.8	73.9	303.95	74.2	274.96	75.38			T
72	278.57	73.92	307.44	74.22					TR
74	285.78	73.87	314.69	74.23					TU
76	288.73	73.48	322.34	74.2	291.91	74.99			T
78	296.13	71.49	328.6	74.18					T
80	301.33	71.28	339.67	73.91					TM
82	315.59	72.18					318.2	76	T
84	322.58	72.99							T
86	327.78	73.7							TR
88	339.67	73.24			347.67	75.96	334.63	75.41	TU

2002 Survey
Conducted by S&EC, PA, Inc
***** Previous stationng adjusted downstream by:*** ***33***
**** Previous surveys elevations adjusted down by:*** ***20.39***

Original Station	Original TW Elevation	Notes	Adjusted Station**	Adjusted TW Elevation*
-30	96.45	TWRI	3	76.06
5	96.09	TWR	38	75.7
18	94.35	TWP	51	73.96
24	95.15	TWG	57	74.76
57	95.85	TWR	90	75.46
69	96.25	TOP Vane	102	75.86
77	94.25	TWP	110	73.86
85	95.67	TOP Vane	118	75.28
103	93.31	TWP	136	72.92
111	94.13	TWG	144	73.74
118	94.71	TWRI	151	74.32
124	94.03	TWP	157	73.64
141	95.01	Riffle X-Sect	174	74.62
157	94.35	TWR	190	73.96
172	93.05	TWP	205	72.66
183	94.27	TWG	216	73.88
192	94.83	TWR	225	74.44
210	94.21	TWR	243	73.82
217	94.85	TOP Vane	250	74.46
221	93.21	TWP	254	72.82
226	93.83	TWG	259	73.44
252	93.91	TOP Vane	285	73.52
268	91.63	TWP	301	71.24
275	92.5	Pool X-Sect	308	72.11
286	92.91	TWG	319	72.52
298	93.69	TWRI	331	73.3
305	93.31	TOP Vane	338	72.92

2001 Survey
Conducted by K-H & Assoc., Inc

Original Station	Original TW Elevation	Notes	Adjusted Station**	Adjusted TW Elevation*
0	96.41		33	76.02
6	95.97		39	75.58
15	94.58	nter of pool, t	48	74.19
24	95.43		57	75.04
33	95.65		66	75.26
46	96.06		79	75.67
57	95.98		90	75.59
68	96.22	top of log	101	75.83
69	94.93	d/s log	102	74.54
69	94.18	scour pool	102	73.79
78	94.86		111	74.47
81	95.46	op of log van	114	75.07
85	94.68		118	74.29
92	94.62		125	74.23
104	93.83	pool	137	73.44
108	94.72	top of glide	141	74.33
116	94.48		149	74.09
129	94.79	top of riffle	162	74.4
135	95.02		168	74.63
140	94.93	enter of pool	173	74.54
141	95.01	riffle	174	74.62
156	94.57	l riffle/begin	189	74.18
162	93.69	l run/begin p	195	73.3
175	93.53	pool	208	73.14
186	94.42	pool/begin g	219	74.03
192	94.67		225	74.28
198	94.63		231	74.24
215	94.55	u/s log	248	74.16
219	94.86		252	74.47
221	93.42	top of log	254	73.03
222	93.47	scour pool	255	73.08
228	94.17	riffle	261	73.78
241	93.75	run	274	73.36
256	94.02	op of log van	289	73.63
258	93.27	d/s log	291	72.88
260	93.27		293	72.88
284	92.61	pool	317	72.22
290	93.23	glide	323	72.84
300	93.98	riffle	333	73.59
302	93.77	riffle	335	73.38
306	93.46	top of log	339	73.07

2000 As-built
Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run Area 1				
Alexander County, NC			Adjusted	Adjusted
Station	TW	Notes	Station**	Elevation*
0	96.4	riffle	33	76.01
6	95.95		39	75.56
15	94.55	er of pool (tribu	48	74.16
24	95.45		57	75.06
33	95.9		66	75.51
46	96		79	75.61
57	96		90	75.61
68	96.25	op of notch in l	101	75.86
69	94.55		102	74.16
80	95.3	logvane	113	74.91
83	94.85	below logvane	116	74.46
94	94.5	begin pool	127	74.11
106	94.4		139	74.01
118	94.7	of pool/begin r	151	74.31
131	94.8		164	74.41
137	95.15	top of riffle	170	74.76
142	94.95	center of riffle	175	74.56
143	94.9	xsection riffle	176	74.51
154	94.8	d riffle/begin r	187	74.41
160	93.8	d run/begin po	193	73.41
173	93.5	center of pool	206	73.11
184	94.3	end pool	217	73.91
190	94.8		223	74.41
196	94.8		229	74.41
213	94.55		246	74.16
219	94.9	op of notch in l	252	74.51
220	93.55		253	73.16
226	94.05		259	73.66
239	93.9		272	73.51
256	94.1	top of log vane	289	73.71
258	93.55		291	73.16
282	92.6	er of pool/xsec	315	72.21
288	92.8		321	72.41
298	93.75		331	73.36
300	94.05	top of riffle	333	73.66
304	94.05	center of riffle	337	73.66

Project Name Jumping Run
Task Longitudinal Profile
Section: Area #4
Date 6/1/04
Crew Shaffer, Bidelspach, Clinton

Symbol Key	
T	Thalweg
TR	Head of Riffle
TP	Head of Pool
TU	Head of Run
TM	Max Pool

2004 Survey* * 2004 elev adjusted up by 2.50 ft

2003 TW Station	TW Station	TW Elev	WS Station	WS Elev	BKF Station	BKF Elev	Feature
0	0.5	71.2	0.39	71.22	26.26	71.89	Tr
2.78	12.35	70.75	6.72	71.22	31.77	72.36	T
6.4	24.29	70.65	12.31	71.16	42.31	71.82	T
15.44	38.39	70.56	24.76	71.26	50.13	71.71	T
22.85	51.88	70.29	38.76	71.15	53.34	72.94	T
31.78	64.39	70.43	52.07	71.1	62.44	72.17	T
55.4	76.47	70.38	63.95	71.14	65.69	73.08	TP
67.18	90.64	70.32	76.17	71.06	76.43	72.58	T
90.59	105.64	70.96	93.89	71.16	93.7	72.33	T
109.36	116.9	70.54	105.39	71.09	94.28	71.89	TR
124.92	125.54	69.99	116.24	70.83	102.06	71.71	T
133.19	131.99	68.96	122.44	70.87	117.75	71.73	TP
136.92	141.3	69.03	131.78	70.67	123.86	72.27	T
149.61	148.56	70.55	141.87	70.85	145.45	71.62	T
163.05	159.9	70.63	148.92	70.84	151.23	71.5	T
175.98	163.27	69.87	159.88	70.76	172.61	71.66	TP
192.57	172.82	69.75	162.61	70.36	208.27	71.47	T
205.89	210.38	70.04	172.08	70.17	212.59	70.91	T
210.84	226.2	69.25	210.65	70.26	222.97	70.77	TR
225.48	233.33	69.01	225.04	70.14	232.79	71.96	TP
231.14	244.36	68.76	233.13	70.13	245.16	71.46	T
240.41	259.16	69.61	244.16	70.15	265.3	71.03	T
261.35	276.17	69.56	259.34	70.1	278.35	70.56	T
286.24	309.54	69.37	275.74	70.12	306.31	71.26	T
295.62	318.17	69.69	309.73	70.13	317.85	71.15	T
322.04	319.27	69.82	319.24	69.98	341.38	70.48	TR
337.61	339.44	69.29	338.92	69.68	343.11	70.93	T
347.45	353.08	68.62	351.84	69.63	373.83	70.59	T
353.96	353.18	68.64	351.89	69.58	375.31	70.35	TP
358.45	355.53	68.68	355.26	69.66	393	71.35	T
372.09	362.44	68.92	363.98	69.64	394.2	70.31	T
381.61	377.4	68.73	378.28	69.6	422.03	70.52	T
391.62	388.07	69.08	387.81	69.68	425.72	70.94	T
396.52	396.26	68.58	395.5	69.58	445.98	70.61	T
415.8	401.11	68.83	401.81	69.63	446.19	70.88	T
	415.44	68.86	415.81	69.6			
	438.05	68.81	437.26	69.37			
	448.2	68.79	449.77	69.49			
	462.24	68.81					

2003 Survey

TW Shot number	TW Station	TW Elev	WS Station	WS Elev	LBKF Station	LBKF Elev	RBKF Station	RBKF Elev	Feature
164	0	71.42	0.61	71.65					T
166	2.78	70.37	1.31	71.64	3.46	73.65			TP
168	6.4	69.14	7.48	71.63					TM
170	15.44	71.17	14.22	71.63			16.64	73.16	T
172	22.85	70.91	23.8	71.55					TR
174	31.78	70.52	32.1	71.52	28.56	73.56			TU
176	55.4	70.32	54.89	71.51			42.59	73.29	T
178	67.18	70.06	66.87	71.47			72.22	73.31	TM
180	90.59	70.51	91.39	71.45	85.12	72.95			T
182	109.4	71.02	109	71.42			105.8	72.4	TR
184	124.9	70.37	125.01	71.23	124.62	72.97			TU
186	133.2	69.35	132.17	71.19					TP
188	136.9	68.7	136.81	71.19					TM
190	149.6	70.45	148.63	71.23			147.9	72.47	T
194	163.1	70.11	161.08	71.15			166.1	72.52	T
196	176	70.15	175.39	70.69	170.09	72.71			T
198	192.6	69.74	193.51	70.64					TM
200	205.9	70.13	204.66	70.65	200.85	73.38			T
202	210.8	70.25	210.49	70.66			215	72.24	TR
204	225.5	69.58	219.77	70.38					TP
206	231.1	68.81	224.16	70.35			228.9	71.96	TM
208	240.4	69.22	229.8	70.35	243.35	71.36	244.4	72.28	T
210	261.4	69.58	241.18	70.35	270.91	71.77			T
212	286.2	69.65	261.39	70.33	286.75	72.24	289.6	71.79	T
214	295.6	69.59	286.99	70.37					T
216	322	70.1	295.99	70.38	319.95	72.5			TR
218	337.6	69.53	321.79	70.32			333.6	71.83	TU
220	347.5	68.96	337.08	70.09					TP
222	354	68.74	346.93	69.94					TM
224	358.5	69.15	353.53	69.93	359.48	71.43			T
226	372.1	69.18	358.78	69.89					T
228	381.6	69.26	374.01	69.84					TR
230	391.6	69.13	383.1	69.82			387.8	71.36	T
232	396.5	68.8	391.75	69.8					T
234	415.8	68.99	396.74	69.82	402.03	71.6			T
			415.48	69.74					

2002 Survey
Conducted by S&EC, PA, Inc
** Previous stationng adjusted downstream by: 0
* Previous surveys elevations adjusted down by: 28.53

Original Station	Original TW Elevation	Notes	Adjusted Station	Adjusted TW Elevation
-20	99.87	TW	-20	71.34
0	99.69	TWR	0	71.16
11	98.49	TWP	11	69.96
21	99.35	TWG	21	70.82
42	99.23	TWR	42	70.7
53	99.33	TWR	53	70.8
59	98.45	TWP	59	69.92
78	99.19	TWG	78	70.66
96	98.97	TWR	96	70.44
118	99.27	TWR	118	70.74
133	98.03	TWP	133	69.5
147	98.73	TWG	147	70.2
157	98.27	TWS	157	69.74
167	99.45	op of Log Va	167	70.92
172	98.29	TWS	172	69.76
186	98.53	TWRI	186	70
197	97.97	TWP	197	69.44
210	98.41	TWG	210	69.88
219	98.81	TW	219	70.28
224	98.49	-Riffle X-sec	224	69.96
236	97.09	TWP	236	68.56
245	97.73	TWR	245	69.2
263	98.01	TWR	263	69.48
280	97.85	TWR	280	69.32
291	97.25	TWP	291	68.72
314	98.11	TWG	314	69.58
328	98.23	TWRI	328	69.7
342	97.61	TWR	342	69.08
358	96.93	TW	358	68.4
360	97.17	'-Pool X-sect	360	68.64
370	97.87	TWG	370	69.34
385.1053464	98.19	TWRI	385	69.66
400.2546566	97.55	TWR	400	69.02
426.092497	97.39	TWP	426	68.86
439.5555873	97.65	TWG	440	69.12
452.6115438	97.95	TWRI	453	69.42

2001 Survey
Conducted by K-H & Assoc., Inc

Original Station	Original TW Elevation	Notes	Adjusted Station	Adjusted TW Elevation
2	100		2	71.47
6	98.67		6	70.14
8	98.42		8	69.89
11	98.49		11	69.96
15	99.39	pool	15	70.86
17	99.38		17	70.85
19	99.63		19	71.1
31	99.08	begin run	31	70.55
42	99.34		42	70.81
57	98.37	of pool, rootw	57	69.84
64	98.4	center of poo	64	69.87
69	99.2	start glide	69	70.67
73	99.53		73	71
82	99.15		82	70.62
95	99.13	middle glide	95	70.6
110	99.49	end glide	110	70.96
119	99.39		119	70.86
114	99.43	riffle	114	70.9
127	99.19	side bend/end	127	70.66
132	98.63	begin pool	132	70.1
136	98.58	center of poo	136	70.05
141	98.18	edge of pool	141	69.65
146	98.96		146	70.43
149	98.78	begin glide	149	70.25
156	98.57	center of glid	156	70.04
162	99.32	riffle	162	70.79
167.5	99.55	op of log not	167.5	71.02
170.5	98.48		170.5	69.95
172.5	98.51		172.5	69.98
174.5	98.53		174.5	70
179.5	98.74		179.5	70.21
183.5	98.88		183.5	70.35
189.5	98.6		189.5	70.07
193.5	98.52	pool	193.5	69.99
196.5	97.88	center of poo	196.5	69.35
199.5	97.48	ersimmon tre	199.5	68.95
208.5	98.74		208.5	70.21
211.5	98.88	begin glide	211.5	70.35
214.5	98.96	top of riffle	214.5	70.43
224.5	98.8	xsection riffl	224.5	70.27
226.5	98.63	end riffle	226.5	70.1
233.5	97.57	end run/begi	233.5	69.04
238.5	97.5	center of poo	238.5	68.97
240	97.92	end pool/beg	240	69.39
250	98.21	glide	250	69.68
259	97.77	persimmon t	259	69.24
266	98.08		266	69.55
273	98.13		273	69.6
278	97.7		278	69.17
285	97.53	center of poo	285	69
293	98.02		293	69.49
298	98.37		298	69.84
300	98.42	holly tree	300	69.89
311	98.33		311	69.8
316	98.38		316	69.85
323	98.46	begin run	323	69.93
331	98.42	center run	331	69.89
341	98.01	end run/begi	341	69.48
350	97.58	erosion	350	69.05
353	97.4	xsection poo	353	68.87
357	97.86	end pool/beg	357	69.33
369	98.42	end glide/beg	369	69.89
377	98.49	begin riffle	377	69.96
385	98.22	begin run	385	69.69
390	97.98	run	390	69.45
393	97.9	run	393	69.37

2000 As-built
Conducted by K-H & Assoc., Inc

Longitudinal Profile - Jumping Run Area 4				
Alexander County, NC			Station	evation
Station	TW	Notes	Adjusted	djusted
0	100		0	71.47
4	99.95	top of rock vane	4	71.42
6	98.95		6	70.42
9	97.9		9	69.37
13	98.3		13	69.77
15	98.8		15	70.27
17	99.3		17	70.77
29	99.4		29	70.87
40	99.45		40	70.92
55	99.45		55	70.92
62	99		62	70.47
67	98.4		67	69.87
71	99.15		71	70.62
80	99.15		80	70.62
93	98.85		93	70.32
101	99.2		101	70.67
110	99.45		110	70.92
118	99.35		118	70.82
123	99.35		123	70.82
128	99		128	70.47
132	98.35		132	69.82
137	98.5		137	69.97
142	98.3		142	69.77
145	98.9		145	70.37
152	98.7		152	70.17
158	98.85		158	70.32
162	99.3		162	70.77
167.5	99.45	enter of notch in lo	167.5	70.92
169	98.6	d/s log	169	70.07
178	98.55		178	70.02
184	98.7		184	70.17
188	98.65		188	70.12
194	98.3		194	69.77
198	97.45		198	68.92
206	98.35		206	69.82
211	98.80		211	70.27
215	98.9		215	70.37
224	98.5	riffle xsection at 22	224	69.97
227	98.45		227	69.92
231	97.75		231	69.22
237	97.5		237	68.97
241	97.8		241	69.27
248	97.9		248	69.37
255	97.95		255	69.42
265	97.75		265	69.22
270	98.15		270	69.62
277	97.85		277	69.32
280	97.4		280	68.87
284	97.5		284	68.97
289	97.95		289	69.42
294	98.05		294	69.52
299	98.4		299	69.87
300	98.35		300	69.82
310	98.35		310	69.82
320	98.4		320	69.87
330	98.35		330	69.82
337	97.7		337	69.17
345	98		345	69.47
347	97.3		347	68.77
350	97.15		350	68.62
355	97.3	pool xsection at 35	355	68.77
363	98.05		363	69.52
368	98.35		368	69.82
377	98.4		377	69.87
383	98.2		383	69.67
387	98		387	69.47
395	97.9		395	69.37

Project Name	Jumping Run
Task	Feature Slope and Length Calculations
Date	6/1/04
Crew	Shaffer, Bidelspach, Clinton

Area 1 - 2004

Riffle Station	Change	Water Elev	change	slope
10.72		95.35		
53.06	42.34	95.15	0.2	0.47%
89.24		95.1		
146.23	56.99	94.8	0.3	0.53%
171.18		93.46		
240.03	68.85	93	0.46	0.67%
310.34		92.24		
341.74	31.4	91.91	0.33	1.05%

Pool Station	length	p-p spacing
53		
89	36	
146		
171	25	87.5
240		
266	26	94.5
275		
310	35	39.5

	min	max	median
Length	31.4	68.9	49.7
Slope	0.47%	1.05%	0.60%
Length	25.0	36.0	30.5
Spacing	40	95	88

Area 1 - 2003

Riffle Station	Change	Water Elev	change	slope
133.22		95.05		
155.15	21.93	93.84	1.21	5.52%
171.95		93.9		
191.78	19.83	93.57	0.33	1.66%
253.65		93.46		
274.57	20.92	93.18	0.28	1.34%

Pool	length	p-p spacing
58.23		
75.05	16.82	
109.26		
133.38	24.12	54.68
154.87		
171.73	16.86	41.98
191.54		
200.17	8.63	32.555
229.77		
253.84	24.07	45.95

	min	max	median
Length	19.8	21.9	20.9
Slope	1.34%	5.52%	1.66%
Length	8.6	24.1	16.9
Spacing	33	55	44

Area 2 - 2004

Riffle Station	Change	Water Elev	change	slope

No Data Reported - See Cross-section Information

Pool	length	p-p spacing

	min	max	median
Length			
Slope			
Length			
Spacing			

Area 2 - 2003

Riffle Station	Change	Water Elev	change	slope
18.06		87.46		
35.45	17.39	87.42	0.04	0.23%
72.96		87.35		
92.26	19.3	87.13	0.22	1.14%
102.52		87.18		
112.58	10.06	87.04	0.14	1.39%
214.28		86.99		
220.34	6.06	86.89	0.1	1.65%
240.3		86.83		
253.91	13.61	86.64	0.19	1.40%
280.35		86.62		
288	7.65	86.16	0.46	6.01%
317.85		86.16		
324.97	7.12	85.64	0.52	7.30%
404.92		85.52		
419.87	14.95	85.37	0.15	1.00%

Pool	length	p-p spacing
35.88		
73.02	37.14	
93.63		
108.12	14.49	46.425
166.2		
196.3	30.1	80.375
220.23		
240.23	20	48.98
253.33		
280.23	26.9	36.55
288.24		
318.2	29.96	36.44
324.39		
362.2	37.81	40.075

	min	max	median
Length	6.1	19.3	11.8
Slope	0.23%	7.30%	1.39%
Length	14.5	37.8	30.0
Spacing	36	80	43

Area 3 - 2004

Riffle Station	Change	Water Elev	change	slope
13		76.28		
33	20	76	0.28	1.40%
72		76.04		
110	38	75.2	0.84	2.21%
169		75.24		
196	27	74.82	0.42	1.56%
220		74.91		
249	29	74.25	0.66	2.28%
328		73.78		
345	17	73.22	0.56	3.29%
388		73.18		
416	28	72.65	0.53	1.89%

Pool	length	p-p spacing
33		
72	39	
110		
169	59	87
196		
220	24	68.5
249		
285	36	59
291		
328	37	42.5
345		
388	43	57

	min	max	median
Length	17.0	38.0	27.5
Slope	1.40%	3.29%	2.05%
Length	24.0	59.0	38.0
Spacing	43	87	59

Area 3 - 2003

Riffle Station	Change	Water Elev	change	slope
0		77.15		
35.11	35.11	76.58	0.57	1.62%
74.47		76.58		
98.1	23.63	76.14	0.44	1.86%
164.66		75.91		
188.1	23.44	75.49	0.42	1.79%
219.35		75.46		
253.24	33.89	74.73	0.73	2.15%
279.07		74.6		
288.56	9.49	74.23	0.37	3.90%

Pool	length	p-p spacing
37.76		
57.3	19.54	
123.29		
150.2	26.91	89.215
187.32		
219.35	32.03	66.59
288.73		
327.78	39.05	104.92

	min	max	median
Length	9.5	35.1	23.6
Slope	1.62%	3.90%	1.86%
Length	19.5	39.1	29.5
Spacing	67	105	89

Area 4 - 2004

Riffle Station	Change	Water Elev	change	slope
0		71.22		
52	52	71.1	0.12	0.23%
105		71.09		
131	26	70.67	0.42	1.62%
211		70.26		
226	15	70.14	0.12	0.80%
309		70.13		
351	42	69.63	0.5	1.19%

Pool	length	p-p spacing
52		
105	53	
131		
159	28	66.5
175		
211	36	48
226		
309	83	74.5
351		
415	64	115.5

	min	max	median
Length	15.0	52.0	34.0
Slope	0.23%	1.62%	1.00%
Length	28.0	83.0	53.0
Spacing	48	116	71

Area 4 - 2003

Riffle Station	Change	Water Elev	change	slope
14.22		71.63		
32.1	17.88	71.52	0.11	0.62%
109		71.42		
132.17	23.17	71.19	0.23	0.99%
161.08		71.15		
175.39	14.31	70.69	0.46	3.21%
210.49		70.66		
224.5	14.01	70.35	0.31	2.21%
321.79		70.32		
346.79	25	69.94	0.38	1.52%

Pool	length	p-p spacing
2.78		
15.44	12.66	
55.4		
109.36	53.96	73.27
124.92		
149.61	24.69	54.885
225		
261	36	105.735
337		
372	35	111.5

	min	max	median
Length	14.0	25.0	17.9
Slope	0.62%	3.21%	1.52%
Length	12.7	54.0	35.0
Spacing	55	112	90

PROFILE*	Jumping Run 2003 - Area 1			Jumping Run 2004 - Area 1			Jumping Run 2003 - Area 2			Jumping Run 2004 - Area 2			Jumping Run 2003 - Area 3			Jumping Run 2004 - Area 3			Jumping Run 2003 - Area 4			Jumping Run 2004 - Area 4		
	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median	Min	Max	Median
Riffle Length	19.8	21.9	20.9	31.4	68.9	49.7	6.1	19.3	11.8				9.5	35.1	23.6	17.0	38.0	27.5	14.0	25.0	17.9	15.0	52.0	34.0
Riffle Slope	1.34%	5.52%	1.66%	0.47%	1.05%	0.60%	0.23%	7.30%	1.39%	No data reported (data collection error)			1.62%	3.90%	1.86%	1.40%	3.29%	2.05%	0.62%	3.21%	1.52%	0.23%	1.62%	1.00%
Pool Length	8.6	24.1	16.9	25.0	36.0	30.5	14.5	37.8	30.0				19.5	39.1	29.5	24.0	59.0	38.0	12.7	54.0	35.0	28.0	83.0	53.0
l to Pool Spacing	32.6	54.7	44.0	39.5	94.5	87.5	36.4	80.4	43.3				66.6	104.9	89.2	42.5	87.0	59.0	54.9	111.5	89.5	48.0	115.5	70.5

*Data for previous monitoring periods were not reported

Project Nam Jumping Run
Task Channel Pattern Measurements

Date 6/1/04
Crew Shaffer, Bidelspach, Clinton

Area 1
2004

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
44	108	32	
34	119	33	
30	126	39	
30			
34			
30	108	32	*min*
44	126	39	*max*
34	119	33	*median*

Area 2
2004

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
25	108	36	
23	59	29	
14	49	45	
16	91	36	
16	80		
15			
43			
29			
14	49	29	*min*
43	108	45	*max*
20	80	36	*median*

Area 3
2004

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
42	124	38	
38	148	46	
30	146	44	
38			
33			
30	124	38	*min*
42	148	46	*max*
38	146	44	*median*

Area 4
2004

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
28	148	35	
36	123	29	
26	76	30	
60	93	29	
28	80	27	
69	66	20	
39			
31			
26	66	20	*min*
69	148	35	*max*
34	87	29	*median*

Area 1
2003

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
27	115	36	
34	123	38	
36		40	
39			
27	115	36	*min*
39	123	40	*max*
35	119	38	*median*

Area 2
2003

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
22	50	36	
22	61	38	
24	75	38	
25	95	39	
26		40	
27		47	
28			
30			
30			
30			
22	50	36	*min*
30	95	47	*max*
27	68	39	*median*

Area 3
2003

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
34	146	43	
41	149	43	
46		50	
58		51	
34	146	43	*min*
58	149	51	*max*
43	147	47	*median*

Area 4
2003

Radius of Curvature	Meander Wavelength	Channel Beltwidth	
30	69	25	
35	71	28	
36	80	31	
39	93	34	
45	106	49	
47	120		
52			
30	69	25	*min*
52	120	49	*max*
39	86	31	*median*

Payne Dairy Stream Restoration
Alexander County, NC

Quad 1

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Liquidambar styraciflua	210	30	15						
Total	**210**	**30**	**15**	**706.9**	**66.7**	**1**	**25**		
Betula nigra	190	15	7.5						
Total			**7.5**	**176.7**	**16.7**	**1**	**25**		
Quercus phellos	180	12	6						
Total			**6**	**113.1**	**10.7**	**1**	**25**		
Acer rubrum	100	9	4.5						
Total			**4.5**	**63.6**	**6.0**	**1**	**25**		
Overall Total				**1060.3**	**100.0**	**4**	**100**		
Total Trees per acre						160			
Planted trees per acre						80			
Natural regen. trees per acre						80			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Cornus amomum	15	75	7	63.6	
Salix nigra	3	15	3	27.3	
Sambucus canadensis	2	10	1	9.1	
Total	**20**	**100**	**11**	**100**	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Fescue sp.	100	90.9	
Solidago sp.	10	9.1	
Total	**110**	**100**	

Payne Dairy Stream Restoration
Alexander County, NC

Quad 2

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Acer rubrum	400	200	100	31415.9					
	500	250	125	49087.4					
Total			**225**	**80503.3**	**97.0**	**2**	**50**		
Liquidambar styracifula	220	40	20	1256.6					
	105	12	20	1256.6					
Total			40	**2513.3**	**3.0**	**2**	**50**		
Overall Total				**83016.6**	**100**	**4**	**100**		
Total Trees per acre						160			
Planted trees per acre						0			
Natural regen. trees per acre						160			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Alnus serrulata	1	9.1	1	2.0	
Salix nigra	10	90.9	13	92.9	
Total	**11**	**100**	**14**	**94.9**	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Panicum virgatum	100	100	
Total	**100**	**100**	

Payne Dairy Stream Restoration
Alexander County, NC

Quad 3

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Quercus phellos	115	12	6	113.0973355					
	149	15	7.5	176.7145868					
Total			**13.5**	**289.8119223**	**56.07902736**	**2**	**66.66666667**		
Fraxinis americana	153	17	8.5	226.9800692					
Total			**8.5**	**226.9800692**	**43.92097264**	**1**	**33.33333333**		
Overall total				516.7919915	100	3	100		
Total Trees per acre						120			
Planted trees per acre						120			
Natural regen. trees per acre						0			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	ank (Importance)
Dispyros virginiana	1	100	1	100	
Total	**1**		**1**		

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Trifolium sp.	5	5.882352941	
Carex sp.	70	82.35294118	
Fescue sp.	10	11.76470588	
Total	85	100	

Payne Dairy Stream Restoration
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Quad 4

Tree Stratum

Species	Height (cm)	Diameter (mm)	Radius (mm)	Σ X-sec. (mm²)	Rel. x-sec (%)	Density	Rel. Density (%)	Rank (Importance)	Average
Platanus occidentalis	160	32	16	804.2					
	42	5	2.5	19.6					
	43	2	1	3.1					
	40	3	1.5	7.1					
	68	5	2.5	19.6					
	96	10	5	78.5					
Total				**932.3**	**33.5**	**6**	**37.5**	**2**	**35.5**
Quercus phellos	138	25	12.5	490.9					
	78	5	2.5	19.6					
	134	10	5	78.5					
	81	10	5	78.5					
	137	7	3.5	38.5					
	23	12	6	113.1					
	142	17	8.5	227.0					
	170	8	4	50.3					
	147.5	8	4	50.3					
Total				**1146.7**	**41.2**	**9**	**56.25**	**1**	**48.7**
Betula nigra	185.5	30	15	706.9					
Total				**706.9**	**25.4**	**1**	**6.25**	**3**	**15.8**
Overall total				**2785.8**	**100.0**	**16**	**100**		**100**
Total Trees per acre						640			
Planted trees per acre						280			
Natural regen. trees per acre						360			

Shrub Stratum

Species	Cover (%)	Rel. cover (%)	Density	Rel. Density (%)	Rank (Importance)
Sambucus canadensis	2	66.7	2	66.7	1
Diospyros virginiana	1	33.3	1	33.3	2
Total	3	100.0	3	100.0	

Herb Stratum

Species	Cover (%)	Rel. cover (%)	Rank (Importance)
Juncus effusus	5	4.8	3
Microstegium	10	9.5	2
Fescue sp.	90	85.7	1
Total	105	100.0	